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CORRECTIONS

MONTHLY WEATHER REVIEW, April 1943, vol. 71: Page 62, table 1, Blue Hill, the first and last columns of figures should be headed "wb."; the same columns for Albuquerque should be headed, "wm."; same table, in the line dated April 23, the expressions, "1.14+", ".78+", ".63+", and ".57+", should be "−1.14", "−1.73", "−1.63", and "−1.57", respectively; bottom line of same table, in the last five columns delete the reference number and substitute *plus signs* in front of the figures; page 63, bottom line of table, the final entry "−729" should be "−729".

MONTHLY WEATHER REVIEW

Editor, EDGAR W. WOOLARD

VOL. 71, No. 5
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SIMULTANEOUS PYRHELIOMETRIC MEASUREMENTS AT DIFFERENT HEIGHTS ON MOUNT WASHINGTON, N. H.

By I. F. HAND,[1] J. H. CONOVER,[2] and W. A. BOLAND[1]

The transmission of solar radiation through the 4,668-foot layer of atmosphere between the top of Mount Washington, N. H., and the Glen House, 4 miles to the east, was observed on October 2 and 3, 1942, by means of simultaneous pyrheliometric measurements at different points.

The standard Smithsonian silver-disk pyrheliometer No. 1-bis of the U. S. Weather Bureau was read at the base of Mount Washington by Boland, and Smithsonian silver-disk pyrheliometer No. 63 of the Harvard Blue Hill Meteorological Observatory was read at the top by Conover. The senior author used a Clark vacuum pyrheliometer with a portable potentiometer, taking readings early in the morning at the base, followed by two series at the Half-way House in mid-morning, and taking noon readings at the summit; during the afternoon of October 2 this itinerary was reversed. Observations were made in 22-minute series, at 45-minute intervals from beginning to beginning, throughout the day. Both Smithsonian pyrheliometers recently had been compared against Smithsonian standards at the Astrophysical Observatory of the Smithsonian Institution in Washington. Factors previously determined for the Clark vacuum pyrheliometer were used in the reductions of the observations, and the fact that there is less than one percent difference between the values of the readings with this instrument and those made with the silver-disk pyrheliometers indicates that all instruments were in excellent agreement.

Mount Washington is the highest peak in northeastern United States; it is in the White Mountains, N. H., at latitude 44°16′ N., longitude 71°18′ W., and altitude 6,288 feet. The Half-way House is 2 miles to the northeast at an elevation of 3,860 feet, while the Glen House, 4 miles east-northeast, has an elevation of 1,620 feet. Although a slightly greater differential might have been obtained by taking the base readings at another point, the horizontal distance from the top would then have been too great, and it is conceivable that the base station might have been in a different type of air mass from the top.

It was agreed that a dry, cool air mass of cP origin would be best for the purpose of observations. The arrival of an air mass of this type can generally be forecast several days in advance; it provides a greater probability of clear weather than most other types; and it usually brings rather pure, dust-free air, with excellent visibility.

The best examples of cPk air in the New England region are provided by air masses which originate in the Hudson Bay region; fresh outbreaks of this type of air are generally most common during the latter part of the winter season, when transportation of delicate apparatus would be impracticable, and therefore it was decided to utilize a cPk air mass or more northwesterly or westerly origin, such as occurs frequently in New England during the autumn.

The air-mass originally chosen for the observations approached New England from an almost due westerly direction, but moved and dissipated much more rapidly than expected. The essential weather characteristics required were consequently lacking; but the preliminary cPk surge fortunately was immediately followed by a secondary outbreak of cPk air of apparently direct north-northwesterly origin, which, while it did not originate in the Hudson Bay region, was nevertheless greatly strengthened in that region during the simultaneous dissipation of the original air-mass over the middle Atlantic region. The secondary outbreak, which was prevalent over New England during October 2 and 3 provided almost ideal conditions. It was preceded by a rather complex system of two cold-front passages, both recorded fairly prominently on the October 1 autographic records of the Mount Washington station.

The air immediately following the passage of such a well-developed cold-front system is usually extremely pure and clear, but such a post-frontal zone also frequently is affected by considerable turbulence, which quite often produces extensive formations of stratocumulus clouds. The latter condition becomes generally less prominent with moderating temperature conditions, and is also much rarer under conditions of rapidly increasing pressures, which occur only during periods of persistent rapid synoptic movement. In all these respects the weather developed favorably; according to the observers on Mount Washington, October 2 was the clearest day of the year. The islands off Portland, Maine, were clearly visible during the early morning; also Whiteface Mountain in New York State, 130 miles to the west-northwest. The maximum visibility was 170 miles to the northwest, the most distance object ever visible in any direction.

The observations are given in table 1. The observed values of Q, the direct solar radiation at normal incidence in gram-calories per square centimeter per minute, were corrected to mean solar distance by the values of the radius vector in the *American Ephemeris;* the corrections are very small (since at this time of the year the sun is nearly at its mean distance) and amount to only a few thousandths of a calorie. The so-called "air mass"—not to be confused with the synoptic air mass—was computed from the formula

$$M=\frac{(B-e)\,R}{76.0\times 58.36\,\sin Z}$$

where B is the barometric pressure in centimeters, e the vapor pressure, 76.0 the normal sea-level pressure, and Z the zenith distance of the sun. The atmospheric transmission coefficient was computed from

$$a^m=\sqrt{\frac{Q_1}{Q_0}}$$

[1] U. S. Weather Bureau. [2] Harvard Blue Hill Observatory.

where Qc is the corrected pyrheliometric reading, and $Q_0 = 1.94$, the value of the "solar constant" as determined by Abbot and his colleagues at the Astrophysical Observatory of the Smithsonian Institution.

The average percentage difference between the readings of the Clark and the two Smithsonian pyrheliometers, when read at the same level, was less than one-tenth of 1 percent, while the maximum percentage difference of any one series was 0.9 percent. According to Abbot, Smithsonian pyrheliometers may be read within one-quarter of one percent by experienced observers, as all three on this expedition were. With such close agreement between the Clark and both Smithsonian pyrheliometers, we may safely assume that all readings are correct within one percent.

The Smithsonian readings are made with the shutter alternately open and closed for 2 minutes, while the Clark readings are instantaneous and made every minute. Had the sky been less clear, we should have expected greater differences between the readings of the two types of pyrheliometers owing to the above differences in manner of reading the instruments. The fact that the Smithsonian and Clark readings were reduced independently by different observers by the use of factors previously determined is evidence of the constancy and calibration of the pyrheliometers.

It is interesting to note that the atmospheric transmission coefficients for the Glen House and the Half-way House are within 1 percent of each other, while, with a single exception, the transmission coefficients at the summit are appreciably higher than either the Half-way House or the base. The temperatures on the 2d ranged from 0° C. at 8:36 a. m. E. W. T. to 12.9° C. at 3:17 p. m. at the base; and from −4.4° C. at 8:36 a. m. to −1.1° C. at 2:32 p. m. at the Summit. On the 3d the temperatures at the base ranged from −2.2° C. at 8:36 a. m. E. W. T. to 12.4° C. shortly after noon; at the Summit they ranged from +0.6° C. to +1.7° C. On the 2d, convection undoubtedly played an important part in raising the haze layer from the base to the area between the Half-way House and the summit, as well shown by the gradually decreasing values of the ratios in columns 11 to 14 of table 1.

Figure 1 shows the plot of the morning observations. The extrapolation of the readings on the morning of the 2d, if carried out to zero air mass, give a value well within 1 percent of the solar constant, 1.94. (See fig. 2.)

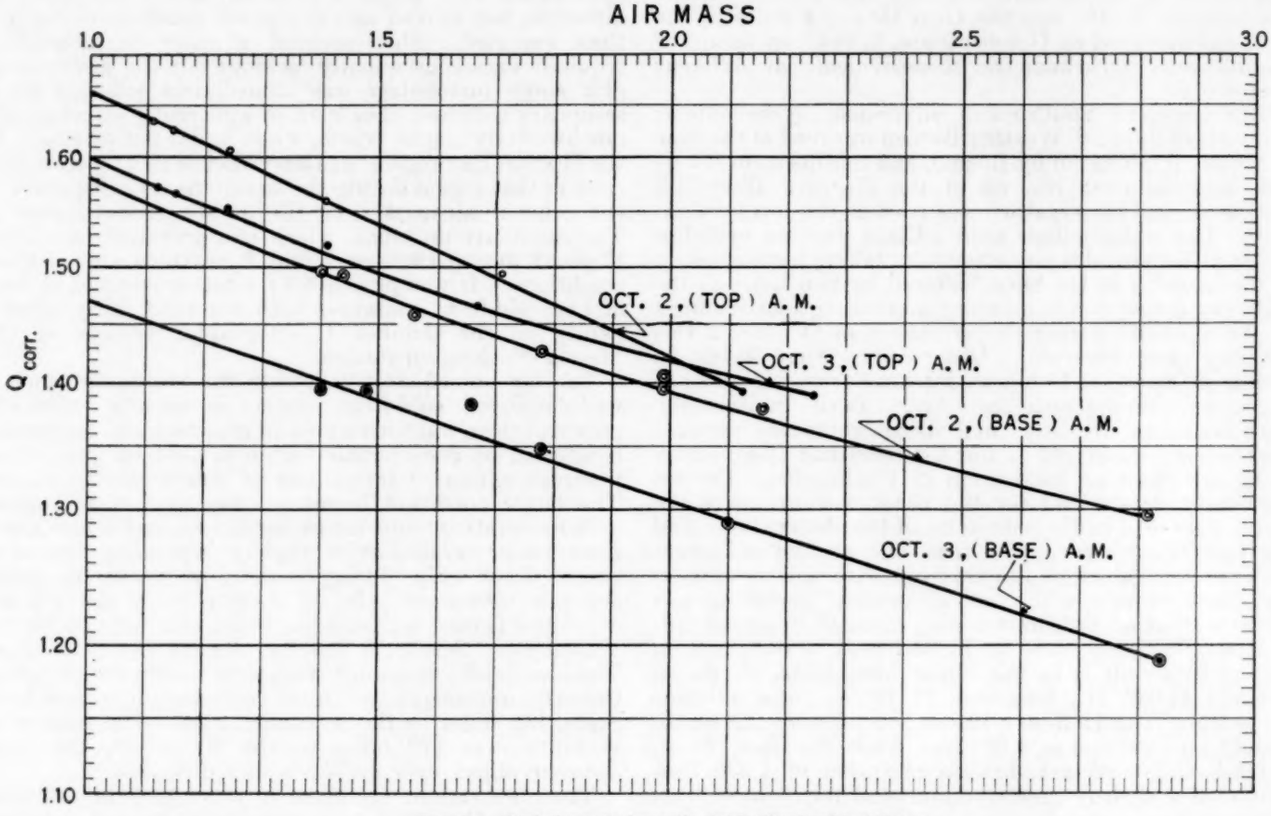


FIGURE 1.—Pyrheliometric observations of October 2 and 3, 1942, a. m.

The station pressure at Mount Washington on October 2 rose from 805.5 mb. at 7 a. m. to 807.8 mb. at 3 p. m. On the following day the pressure remained stationary at 811 mb. all the morning. The relative humidity on October 2 was 39 percent at 7 a. m., 48 percent at 8 a. m., and gradually dropped to 20 percent at noon followed by a gradual rise to 69 percent at 4 p. m. On the 3d the relative humidity values varied from 35 percent at 7 a. m. to 72 percent at noon. The vapor-pressures at Mount Washington on October 2 at 8 a. m. and solar noon were 1.24 and 1.52 mb. and for the same times on October 3, 1.68 and 1.78 mb. respectively.

The noon readings on Mount Washington on the 2d were the highest ever obtained by the Weather Bureau, with the exception of a few 20 years ago at Santa Fe', N. Mex., and those obtained on the top of Mount Evans at an

elevation of 14,260 feet, in 1938 (Mo. WEA. REV., Sept. 1939, 67:331–338). The most outstanding feature of the observations was the transparency of the atmosphere between the base station and the summit of Mount Washington.

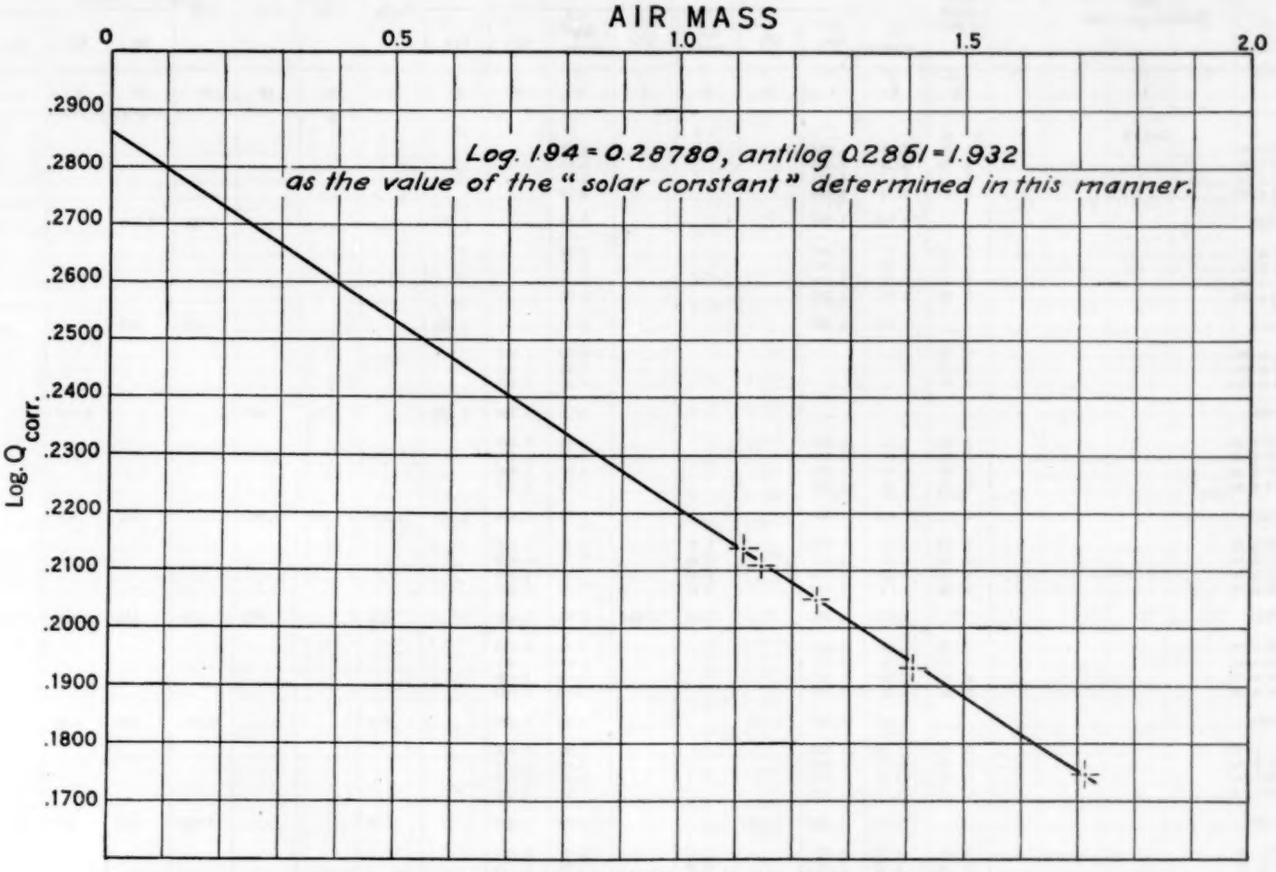


FIGURE 2.—Pyrheliometric observations of October 2, 1942, extrapolated to zero air mass.

Although the Half-way House is, as the name implies, almost exactly half-way in altitude between the base and the summit, the readings at the Half-way House were only 2 to 3 percent higher on the 2d. than the readings at the base, while the readings at the summit ranged from 7 to 11 percent higher than those at the base. On the 3d the readings at the Half-way House were only 4 percent higher than those at the base while the readings on the summit ranged from 11 to 14 percent higher than those at the base. This seems to indicate that the air layer between the Half-way House and the Summit was decidedly hazier than the layer below the Half-way House. During the forenoon of the 3d there was an obvious sharp temperature inversion between the Half-way House and the summit, and on both days there was an appreciable difference in clearness between the upper and lower parts of the Mountain.

ACKNOWLEDGMENTS

The authors wish to express their sincere thanks to Mrs. Hand and Mrs. Conover for aid in recording data; to Mr. Noyes of the Mount Washington Summit Road Co., and to Messrs. Lafayette Gosselin and Victor Clark, and their associates for the respective courtesies they accorded the observers.

TABLE 1.—*Pyrheliometric readings, Mount Washington, N. H., and vicinity*

1942 Eastern war time	Hour angle of sun	Mount Washington			Half-way House		Glen House			S_1/S_n	C/S_1	S_1/C	C/S	Atmospheric transmission coefficients		
		Air mass	Q^1_o	Q^2_o	Air mass	Q^2_o	Air mass	Q^1_o	Q^2_o					Q_1	Q_2	Q_2
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Oct. 2	h. m.															
8:36 a. m.	3 59	2.34	1.364				2.95									
8:40 a. m.	3 55	2.25	1.394				2.86									
8:44 a. m.	3 51	2.17	1.391				2.77									
8:48 a. m.	3 47	2.10	1.422				2.69									
Means		2.215	1.393				2.82		1.292				0.927	0.861		0.866
9:17 a. m.	3 18	1.77	1.488				2.23									
9:21 a. m.	3 14	1.73	1.492				2.18									
9:25 a. m.	3 10	1.69	1.500				2.14									
9:29 a. m.	3 06	1.66	1.501				2.09									
Means		1.712	1.495				2.16		1.380				.923	.859		.854
9:36 a. m.	2 59						2.02	1.397								
9:40 a. m.	2 55						1.99	1.388								
9:44 a. m.	2 51						1.96	1.397								
Means							1.99	1.394	1.405		*1.008	.992			0.847	
10:02 a. m.	2 33	1.44	1.555				1.83	1.419								
10:06 a. m.	2 29	1.42	1.546				1.80	1.423								
10:10 a. m.	2 25	1.40	1.572				1.77	1.426								
10:14 a. m.	2 21	1.38	1.565				1.74	1.437								
Means		1.410	1.560				1.78	1.426	1.423	0.914	*.998	1.002		.857	.841	
10:47 a. m.	1 48	1.26	1.609		1.46		1.58	1.449								
10:51 a. m.	1 44	1.25	1.602		1.44		1.56	1.459								
10:55 a. m.	1 40	1.23	1.601		1.43		1.55	1.461								
10:59 a. m.	1 36	1.22	1.602		1.41		1.54	1.466								
Means		1.240	1.606		1.44	1.495	1.56	1.459		.908		.976	.931	.859	.833	.834
11:36 a. m.	0 59	1.15	1.634				1.44	1.493								
11:40 a. m.	0 55	1.15	1.606				1.44	1.491								
11:44 a. m.	0 51	1.14	1.643				1.43	1.490								
11:48 a. m.	0 47	1.14	1.623				1.43	1.503								
Means		1.145	1.625	1.626			1.44	1.494		.919			*1.001	.856	.834	
12:17 p. m.	0 18	1.12	1.626				1.40	1.488								
12:25 p. m.	0 10	1.11	1.632				1.40	1.501								
12:29 p. m.	0 06	1.11	1.650				1.40	1.507								
12:33 p. m.	0 02	1.11	1.635				1.40	1.491								
Means		1.112	1.636	1.630			1.40	1.497		.915			*.996	.858	.831	
1:02 p. m.	0 37	1.12	1.616		1.30		1.41	1.495								
1:06 p. m.	0 41	1.12	1.622		1.30		1.41	1.484								
1:10 p. m.	0 45	1.13	1.622		1.30		1.42	1.481								
1:14 p. m.	0 49	1.13	1.629		1.31		1.42	1.484								
Means		1.12	1.624		1.30	1.520	1.42	1.486		.915		.978		.853	.829	829
1:47 p. m.	1 12	1.17	1.622		1.36		1.50	1.441								
1:51 p. m.	1 16	1.18	1.606		1.37		1.51	1.472								
1:55 p. m.	1 20	1.19	1.605		1.38		1.53	1.465								
1:59 p. m.	1 24	1.20	1.624		1.39		1.54	1.465								
2:03 p. m.	1 28	1.21	1.628		1.40		1.56	1.470								
Means		1.19	1.617		1.38	1.486	1.53	1.463		.905		.988		.858	.832	.824
2:32 p. m.	1 57	1.29	1.592				1.63	1.442								
2:36 p. m.	2 01	1.30	1.590				1.64	1.441								
2:40 p. m.	2 05	1.31	1.589				1.66	1.427								
2:44 p. m.	2 09	1.33	1.599				1.68	1.434								
2:48 p. m.	2 13	1.35	1.578				1.70	1.439								
Means		1.32	1.590				1.66	1.437	1.445	.904	*1.006	.994		.860	.834	
3:17 p. m.	2 42	1.50	1.530				1.88	1.380								
3:21 p. m.	2 46	1.52	1.536				1.90	1.367								
3:25 p. m.	2 50	1.55	1.544				1.92	1.375								
3:29 p. m.	2 54	1.57	1.526				1.93	1.344								
3:33 p. m.	2 58	1.60	1.523				1.94	1.361								
Means		1.55	1.532				1.92	1.365	1.353	.891	*.991	1.009		.859	.833	
	h. m.															
4:02 p. m.	3 27	1.89	1.505				2.35	1.295								
4:06 p. m.	3 31	1.95	1.497				2.42	1.274								
4:10 p. m.	3 35	2.01	1.479				2.48	1.255								
4:14 p. m.	3 39	2.05	1.470				2.54	1.268								
4:18 p. m.	3 43	2.10	1.443				2.65	1.243								
Means		2.00	1.479				2.49	1.267	1.267	.857	*1.000	1.000		.873	.843	
4:47 p. m.	4 12	2.62	1.353				3.34	1.133								
4:51 p. m.	4 16	2.73	1.328				3.46	1.129								
4:55 p. m.	4 20	2.85	1.326				3.59	1.112								
4:59 p. m.	4 24	3.06	1.316				3.74	1.109								
Means		2.82	1.331				3.53	1.121	1.134	.842	*1.012	.989		.875	.856	

See footnote at end of table.

TABLE 1.—*Pyrheliometric readings, Mount Washington, N. H., and vicinity*—Continued

1942 Eastern war time	Hour angle of sun	Mount Washington			Half-way House		Glen House			S_1/S_a	C/S_1	S_1/C	C/S	Atmospheric transmission coefficients		
		Air mass	Q^1_e	Q^2_e	Air mass	Q^2_e	Air mass	Q^1_e	Q^2_e					Q_1	Q_2	Q_2
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Oct. 3	h m															
8:36 a. m.	3 58	2.35	1.364				2.97									
8:40 a. m.	3 54	2.29	1.369				2.89									
8:44 a. m.	3 50	2.22	1.405				2.80									
8:48 a. m.	3 46	2.15	1.423				2.72									
Means		2.25	1.390				2.84		1.190				.856	.862		.842
9:22 a. m.	3 12	1.73	1.450				2.16									
9:26 a. m.	3 08	1.69	1.466				2.12									
9:30 a. m.	3 04	1.65	1.486				2.08									
9:34 a. m.	3 00	1.62	1.473				2.04									
Means		1.67	1.468				2.10		1.290				.879	.846		.823
10:02 a. m.	2 32	1.45	1.504													
10:05 a. m.	2 29						1.83	1.347								
10:06 a. m.	2 28	1.43	1.526													
10:09 a. m.	2 25						1.80	1.345								
10:10 a. m.	2 24	1.41	1.510													
10:13 a. m.	2 21						1.77	1.358								
10:14 a. m.	2 20	1.39	1.523													
10:17 a. m.	2 17						1.75	1.356								
10:18 a. m.	2 16	1.37	1.537													
10:21 a. m.	2 13						1.73	1.346								
Means		1.41	1.520				1.78	1.350	1.340	.888	.903	*1.007		.841	.816	
10:47 a. m.	1 47	1.26	1.534		1.46		1.69	1.374								
10:51 a. m.	1 43	1.25	1.546		1.44		1.68	1.381								
10:55 a. m.	1 39	1.24	1.561		1.42		1.66	1.376								
10:59 a. m.	1 35	1.22	1.567		1.40		1.64	1.394								
11:03 a. m.	1 31	1.21	1.557		1.38		1.63	1.395								
Means		1.24	1.553		1.42	1.437	1.66	1.384		.891	1.038		.925	.836	.816	.809
11:32 a. m.	1 02	1.17	1.551				1.46	1.394								
11:36 a. m.	0 58	1.16	1.560				1.47	1.378								
11:40 a. m.	0 54	1.15	1.568				1.48	1.401								
11:44 a. m.	0 50	1.14	1.573				1.49	1.404								
11:48 a. m.	0 46	1.14	1.576				1.50	1.395								
Means		1.15	1.566				1.48	1.394		.890				.830	.800	
12:17 p. m.	0 17	1.12	1.576													
12:19 p. m.	0 15						1.40	1.404								
12:21 p. m.	0 13	1.12	1.570													
12:23 p. m.	0 11						1.40	1.393								
12:25 p. m.	0 09	1.11	1.567													
12:27 p. m.	0 07						1.40	1.382								
12:29 p. m.	0 05	1.11	1.579													
12:31 p. m.							1.40	1.404								
Means		1.12	1.573				1.40	1.396		.887				.829	.791	

(4) Observations taken by J. H. C. with Smithsonian silver-disk pyrheliometer No. 63.
(5) Observations taken by I. F. H. with Clark vacuum pyrheliometer. (Means of all observations taken during the times under (1).)
(7) Observations with Clark normal incidence pyrheliometer. (Means of all observations taken during times under (1).)
(9) Observations taken by W. A. B. with U. S. Weather Bureau Smithsonian silver-disk pyrheliometer No. 1-bis.
(10) Measurements made by I. F. H. with Clark vacuum pyrheliometer. (Means of all observations taken during times under (1).)
(11) Smithsonian normal incidence values at the Glen House divided by the Smithsonian normal incidence values at the summit.
(12) Clark normal incidence values (at whatever height the observations were taken) divided by the Smithsonian normal incidence values at the Glen House.
(13) Smithsonian normal incidence values taken at the base divided by the Clark normal incidence values.
(14) Clark normal incidence values divided by the Smithsonian normal incidence values at different levels.
(15) Atmospheric transmission coefficients for readings taken with the Smithsonian silver-disk No. 63 at the summit.
(16) Atmospheric transmission coefficients for readings with the Clark vacuum pyrheliometer.
(17) Atmospheric transmission coefficients for the U. S. Weather Bureau Smithsonian silver-disk pyrheliometer No. 1-bis at the Glen House.

*Ratios between the Clark and the Smithsonian pyrheliometers when both types were at the same level. Used as check readings to determine the accuracy of the instruments

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR MAY 1943

[Climate and Crop Weather Division, J. B. KINCER, in charge]

AEROLOGICAL OBSERVATIONS

NOTICE.—Effective with the December 1942 issue, the publication of table 1 (RAOB summaries) was discontinued indefinitely.—EDITOR.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during May 1943. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (538 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (870 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (17 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,196 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	29	187	2.7	30	235	3.4	30	194	1.2	31	308	1.8	31	301	1.3	30	323	5.2	31	129	7.3	27	213	3.9	30	208	1.4	30	172	1.8	30	245	1.1	29	342	1.4	31	232	4.8
500							30	215	1.3										31	138	8.4	27	236	5.3	30	218	2.4	30	179	3.9	30	236	3.5						
1,000	28	191	4.8				30	240	2.1				31	293	1.7	30	318	5.8	23	144	6.9	25	244	6.2	29	243	3.1	29	214	2.5	27	232	6.7						
1,500	26	193	6.0				29	253	2.4	31	308	2.7	28	267	2.6	30	310	5.7	19	165	5.9	20	253	7.4	27	262	4.1	28	286	2.1	25	239	6.9				31	241	4.5
2,000	24	211	6.2	30	245	4.3	27	271	4.4	30	301	2.7	23	266	3.9	30	305	5.6	14	162	4.1	15	266	6.7	20	274	7.6	25	308	3.4	17	258	9.1	29	354	1.7	31	245	4.3
2,500	23	216	7.5	30	247	4.7	25	276	5.8	28	291	4.4	21	261	4.6	28	288	5.0	14	186	2.2	11	270	6.4	14	252	8.3	24	312	4.2	14	263	12.2	28	336	1.0	31	249	5.0
3,000	21	225	7.8	30	254	5.9	24	282	6.5	28	288	5.6	19	271	7.2	26	286	4.9	13	216	1.7				12	293	10.9	23	309	4.4	10	274	10.6	24	263	2.9	31	242	5.6
4,000	19	255	8.9	28	255	9.4	20	282	9.0	18	277	8.6	15	268	8.2	24	278	6.7	11	270	1.9							18	295	7.4				20	274	8.4	29	249	8.8
5,000	17	264	10.7	24	260	13.7	18	283	9.7	12	273	10.4	13	269	10.6	21	287	9.9	11	294	4.2							17	303	8.0				15	273	11.8	29	250	9.9
6,000	14	268	12.6	20	260	16.7	16	285	11.4	10	282	11.8				20	279	13.5	11	287	4.2							15	290	9.6				13	278	13.6	26	258	10.7
8,000	12	263	12.7	15	266	15.0	14	290	13.8	10	271	14.5				14	287	18.7										12	305	11.6							25	256	14.9
10,000							12	285	16.6							10	271	24.4																		16	269	12.4
12,000																																					13	274	11.1

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (573 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (15 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	31	293	2.3	30	310	1.6	30	212	2.0	29	283	2.0	30	106	4.9	25	266	2.2	31	220	1.5	29	191	2.0	31	308	2.1	30	114	3.2	27	164	2.1	31	221	2.1	29	199	2.6
500							30	220	3.3				30	107	3.7	25	245	3.0				29	196	3.0	31	310	2.6	30	112	5.0	27	172	2.5	31	221	3.4	29	234	3.4
1,000							29	242	4.1	29	276	2.0	28	161	0.8	23	256	3.8	31	208	3.0	28	206	5.0	31	313	2.7	24	106	2.7	22	211	1.3	29	216	4.2	29	257	4.6
1,500				30	296	2.4	29	253	4.7	29	281	2.8	27	294	1.4	20	279	6.1	31	224	3.1	27	226	6.5	31	303	2.3	23	53	1.5	18	280	0.8	29	228	4.7	28	270	6.5
2,000	31	285	2.9	30	281	4.0	26	280	6.5	28	264	3.2	26	317	2.4	18	272	8.1	31	237	3.5	22	237	6.8	30	294	2.0	20	32	1.5	17	295	1.4	27	243	6.1	24	273	8.2
2,500	31	282	3.0	30	269	4.6	25	290	7.7	24	259	5.3	26	325	3.2	17	279	10.2	31	251	4.1	19	258	7.5	26	337	2.5	18	44	1.7	14	327	2.1	26	249	8.4	18	284	10.4
3,000	30	276	3.6	30	257	5.7	23	289	9.4	19	252	6.6	24	310	2.9	15	278	10.6	31	273	5.1	14	261	7.9	25	320	4.5	16	58	1.9	14	325	2.5	20	267	11.3	14	294	11.3
4,000	27	265	5.3	27	241	6.8	21	284	11.8				22	292	3.4				30	281	8.9	12	260	9.8	22	304	7.6	16	16	1.9	12	331	3.6	15	279	14.1			
5,000	23	271	10.5	14	277	9.2	18	287	12.8				20	284	4.3				28	285	10.2	11	268	11.1	19	300	10.6	13	306	0.4	10	319	4.5	12	281	14.7			
6,000	23	283	13.7	10	265	8.4	18	287	14.2				18	289	5.8				28	282	11.7				18	296	14.4	11	344	2.5				10	285	16.3			
8,000	12	291	18.4				14	290	16.7				17	292	10.2				26	280	18.2				14	303	18.2												
10,000							12	285	16.4				14	306	12.6				25	272	21.1																		
12,000													12	308	17.0				16	284	20.2																		
14,000																			10	276	12.2																		

Altitude (meters), m. s. l.	Oakland Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix Ariz. (388 m.)			Rapid City S. Dak. (982 m.)			St. Louis Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie, (230 m.) Mich.			Seattle, Wash. (12 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	269	5.9	22	183	4.7	30	130	0.6	31	260	1.5	31	352	2.0	30	201	1.4	29	257	1.8	31	144	4.8	31	266	3.8	28	291	2.7	31	239	1.9	31	245	3.3	31	216	1.4
500	30	310	3.4	22	186	5.9	30	158	1.0	31	268	3.1				30	216	1.7	29	239	1.8	31	150	5.7	31	286	3.5	28	290	2.6	31	233	2.2				31	252	2.2
1,000	30	324	3.2	22	193	6.6	30	187	1.8	31	255	3.3	31	349	2.0	26	210	3.7	28	240	2.5	31	158	6.3	23	307	2.5	27	293	2.9	28	230	2.2	31	241	3.9	31	246	4.3
1,500	30	328	4.6	21	208	8.6	27	218	3.1	31	244	3.8	31	325	2.1	22	232	6.4	24	221	3.1	29	175	5.8	21	304	2.2	24	290	4.0	23	242	2.6	31	247	4.6	28	260	5.6
2,000	29	327	3.7	21	228	10.2	24	252	5.6	31	239	4.3	29	307	2.2	20	240	7.7	23	237	4.0	26	190	4.5	20	291	2.4	21	289	5.0	20	237	2.6	27	244	5.0	25	268	7.7
2,500	29	330	5.1	18	244	10.6	17	258	6.6	31	240	5.3	27	274	3.5	15	254	9.9	18	241	5.0	19	215	4.9	20	285	3.3	20	293	6.3	16	255	3.9	23	252	5.1	22	268	8.7
3,000	29	321	5.3	17	245	13.6	17	260	7.7	31	245	5.9	19	273	5.4	12	257	12.6	14	253	6.0	19	239	4.8	20	269	4.3	19	290	8.9	14	267	4.3	19	241	5.3	19	269	11.0
4,000	29	310	8.4	13	263	13.8	10	280	11.1	30	255	9.2	12	256	5.8	10	275	15.5				17	264	5.2	16	277	6.4	13	311	7.9	10	275	5.2	14	263	6.2	14	265	11.5
5,000	28	307	10.2	13	268	14.8				30	265	9.9										12	275	5.0	16	276	7.7	11	310	12.3							10	267	15.0
6,000	27	298	12.8	12	267	15.3				28	276	10.7										10	282	8.4															
8,000	22	285	14.1							20	304	13.0																											
10,000	17	287	13.4							15	296	15.5																											
12,000	14	288	13.2																																				

TABLE 3.—*Maximum free-air wind velocities (M. P. S.), for different sections of the United States, based on pilot-balloon observations during May 1943*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	39.1	w.	1,570	7	Philipsburg, Pa.	46.0	w.	4,780	14	Boston, Mass.	75.2	wnw.	8,120	10	Caribou, Maine.
East-Central [2]	37.1	ssw.	1,290	11	Knoxville, Tenn.	44.0	w.	5,000	3	Huntington, W. Va.	56.6	nw.	9,460	1	Huntington, W. Va.
Southeast [3]	26.3	ssw.	1,010	11	Charleston, S. C.	27.2	sw.	4,600	25	Jacksonville, Fla.	50.0	w.	13,900	1	Miami, Fla.
North-Central [4]	39.2	wsw.	2,500	16	Detroit, Mich.	45.2	w.	4,780	13	Alpena, Mich.	55.0	nnw.	8,680	4	Sault Ste. Marie, Mich
Central [5]	43.2	wsw.	1,960	2	Wichita, Kans.	47.5	sw.	3,200	5	St. Louis, Mo.	47.2	w.	13,210	11	Wichita, Kans.
South-Central [6]	37.0	s.	2,000	5	Texarkana, Ark.	39.2	n.	3,440	25	Texarkana, Ark.	67.5	w.	12,000	11	Oklahoma City, Okla.
Northwest [7]	37.4	w.	1,340	4	Great Falls, Mont.	41.0	w.	3,910	22	Great Falls, Mont.	64.4	nnw.	9,310	8	Great Falls, Mont.
West-Central [8]	27.3	nne.	2,500	8	Redding, Calif.	41.5	nw.	4,620	7	Winnemucca, Nev.	68.0	w.	6,800	15	Modena, Utah.
Southwest [9]	27.8	w.	2,280	15	Roswell, N. Mex.	38.5	w.	4,910	7	Raton, N. Mex.	68.0	wnw.	11,340	6	Reno, Nev.
											68.0	wsw.	9,670	17	Winslow, Ariz.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, Southern Ohio, Kentucky, Eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and Western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, Northern Nevada, and Northern California.
[9] Southern California, Southern Nevada, Arizona, New Mexico, and extreme West Texas.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

Excessive flooding extended over seven States from Oklahoma northeastward to southern Michigan during May, causing great damage in the extensive agricultural and industrial areas of this region. This may be ranked as the most outstanding flood event since the great flood in the Ohio Valley of January-February 1937. Although direct loss of life was relatively small, property and crop damage was especially disastrous.

The floods were caused by unprecedented rains which occurred in most areas, in two general storm periods, the first from May 6 to 11, and the second, May 14 to 20. These storms produced record rainfall for May in the States of Indiana, Illinois, Missouri, and Oklahoma, in which more than twice the normal amount of rain fell.

Elsewhere precipitation during May was generally above normal from the Rocky Mountains eastward except in Louisiana, Mississippi, Alabama, the Carolinas, South Dakota, and Nebraska. The far western States had below-normal precipitation, the far Southwest having less than half the normal amount.

Floods in Central States.—The extensive, and in many cases record-breaking, floods covered the following States: eastern Oklahoma, southeastern Kansas, Missouri, Arkansas, Illinois, Indiana, and southern Michigan. The Neosho (Grand), Illinois, Verdigris, Walnut, Cimarron, and Poteau Rivers, and the Arkansas River from Tulsa, Okla., to the mouth, in the Arkansas Basin; the White River Basin in Arkansas and Missouri; the Osage, Grand, and Gasconade Rivers, and the Missouri River from Jefferson City, Mo., to the mouth, in the Missouri Basin; the Illinois, Kaskaskia, and Meramec Rivers, and the Mississippi River from Grafton, Ill., to New Madrid, Mo., in the upper Mississippi Basin; the entire Wabash River system except the East Fork of the White, and the Maumee River Basin, were the principal rivers affected.

Relatively short-time stage records were exceeded at many places and, as shown in the accompanying table, long-time records were broken at several places along the Illinois River, the Osage River in Missouri, portions of the Wabash River, the Arkansas River from Muskogee, Okla., to Dardanelle, Ark., and tributaries of the Arkansas in Kansas and Oklahoma. Records which have stood since 1833 were broken in the Arkansas River, the stage at Fort Smith, Ark., reaching a peak of 41.7 feet in the first rise on May 23, against a stage of 38.0 feet in 1833. In the Osage River, the great flood of 1844 was exceeded by about 9 feet at Tuscumbia, Mo., and by about 4 feet at St. Thomas, Mo. At St. Louis, Mo., the Mississippi reached a stage of 38.9 feet on May 24, just 2.5 feet below the maximum stage of 1844.

At the beginning of the month river stages were considerably below normal in all of the flood area except that stages in the Missouri and upper Mississippi Rivers were still moderately high from the snow-smelt run-off in April. Thus, conditions were relatively favorable for the retention of water in the basins.

The effective rains began on May 6, when amounts up to more than 5 inches occurred in the Verdigris and Neosho Rivers in Kansas. The precipitation then spread rapidly northeastward to Indiana and southern Michigan and southward into eastern Oklahoma and northern Arkansas. Heavy rains continued until the 12th, when there was a respite from rain in the flood area for several days. Rains began again on May 14, and continued heavy over the same areas until May 20. More scattered rains extended through the remainder of the month but were not particularly effective as far as the floods were concerned.

The meteorological conditions associated with the floods were characterized by the presence of a warm, moist anticyclone centered off the South Atlantic coast, and a cold, dry anticyclone occupying all of the northwestern third of the country.

The region (or trough) of low pressure between the two high-pressure cells, continued to occupy the same general area extending from Texas northeastward to the eastern Great Lakes, throughout the period from early May to the 21st of the month. A stationary front, in the trough of low pressure persisted and minor waves along the front produced a succession of 12- to 24-hour periods of heavy rainfall in areas extending from Oklahoma and Arkansas to southern Michigan.

A more complete report of these floods will be given in a later issue of the REVIEW.

SUMMARY OF CREST STAGES FOR FLOODS OF MAY 1943

River and station	Flood stage	Highest known flood		Crest(s) during May 1943	
		Stage	Year	Stage	Date
Maumee:					
Fort Wayne, Ind.	15	26.1	1913	19.7 22.2	13 19
Illinois:					
Morris, Ill.	13	26.85	1866	21.6	21
Peru, Ill.	17	27.0	1916	[1] 28.0	22
Peoria, Ill.	18	26.3	1844	28.6	23
Havana, Ill.	14	23.5	1926	27.3	25
Beardstown, Ill.	14	26.25	1926	29.7	26–27
Meramec River:					
Sullivan, Mo.	11	33.0	1915	20.1	20
Pacific, Mo.	11	30.8	1915	22.0	21
Valley Park, Mo.	14	37.85	1915	22.8 26.2	13 22
Grand River:					
Gallatin, Mo.	20	39.3	1909	23.6	17
Chillicothe, Mo.	18	33.65	1909	28.4	18
Brunswick, Mo.	12	23.0	1909	15.5	20–21
Osage River:					
Quenemo, Kans.	27	38.4	1928	18.8 31.2	16 19
Ottawa, Kans.	24	37.6	1928	14.2 26.1	16 19
La Cygne, Kans.	25	30.8	1925	30.1	21
Trading Post, Kans.	24	34.45	1929	27.8	19
Osceola, Mo.	20	45.3	1844	41.5	20
Lakeside (Bagnell Dam), Mo.	60	62.3	1941	62.3 65.4	13–14 22
Osage:					
Tuscumbia, Mo.		39.6	1844	29.8 48.5	13 20
St. Thomas, Mo.	23	39.4	1844	27.5 43.7	13 20
Gasconade:					
Jerome, Mo.	15	29.0	1897	24.4	21
Missouri:					
Boonville, Mo.	21	32.69	1844	23.5	20
Jefferson City, Mo.		33.5	1903	27.8	21
Hermann, Mo.	21	35.7	1844	21.2 30.9	12 22
St. Charles, Mo.	25	40.11	1844	26.3 36.6	13 22
Wabash:					
Bluffton, Ind.	10	20.0	1913	14.7	19
Logansport, Ind.	17	25.3	1913	21.4	19
La Fayette, Ind.	11	32.9	1913	28.4	19
Covington, Ind.	16	35.1	1913	32.4	20
Terre Haute, Ind.	14	31.3	1913	30.5	20
Vincennes, Ind.	14	25.2	1930	27.0	22
Mt. Carmel, Ill.	17	31.0	1913	27.5	25
New Harmony, Ind.	15	27.2	1913	23.8	26
White:					
Cotter, Ark.	21	42.5	1927	39.7 28.5	12 21
Calico Rock, Ark.	19	51.9	1916	46.8 29.6	11 21
Batesville, Ark.	23	43.4	1916	39.9 32.0	13 22
Newport, Ark.	26	35.6	1927	34.5 31.0	15 23–24
Georgetown, Ark.	21	31.3	1935	31.4 29.3	18 26
Clarendon, Ark.	26	43.3	1927	33.2	30–June 1
Walnut:					
Winfield, Kans.	23	40.6	1928	39.7	19
Cimarron:					
Perkins, Okla.	11	14.6	1932	14.4	20
Verdigris:					
Independence, Kans.	36	46.7	1904	47.6 27.4	20 26
Claremore, Okla.		46.6	1941	46.6 55.0	14 22
Burlington, Kans.	23	34.4	1928	23.0	19–20
Iola, Kans.	15	22.1	1926	20.7	19
Chanute, Kans.	20	28.3	1928	28.9	19
Parsons, Kans.	22	27.5	1928	24.2 29.25	11 20
Oswego, Kans.	17	25.4	1927	22.1 25.8	11 21
Poteau:					
Poteau, Okla.	21			37.0 26.6	12 22
Arkansas:					
Tulsa, Okla.	12	19.8	1923	10.4 16.7	10 20
Muskogee, Okla.		37.2	1941	38.5 48.4	11 21
Webbers Falls, Okla.	23	38.2	1833	38.5 40.4	11 22
Fort Smith, Ark.	22	38.0	1833	41.7 38.8	12 23
Van Buren, Ark.	22	35.8	1941	38.1 37.0	12 23
Ozark, Ark.	22	36.2	1927	38.4 38.4	14 24
Dardanelle, Ark.	22	33.0	1927	33.8 34.0	14 25

SUMMARY OF CREST STAGES FOR FLOODS OF MAY 1943—Continued

River and station	Flood stage	Highest known flood		Crest(s) during May 1943	
		Stage	Year	Stage	Date
Arkansas—Continued.					
Morrilton, Ark.	20	32.0	1927	30.8 30.5	15 26
Little Rock, Ark.	23	34.6	1833	28.4 30.0	17 27–28
Pine Bluff, Ark.	25	33.0	1935	32.8 33.8	17 28
Mississippi:					
St. Louis, Mo.	30	41.4	1844	26.5 38.9	14 24
Chester, Ill.	27	39.7	1844	38.0	25
Cape Girardeau, Mo.	32	42.5	1844	31.4 42.4	15 27
New Madrid, Mo.	34	47.9	1937	41.3	31
Cairo, Ill. (Ohio)	40	59.5	1937	53.0	30

[1] Estimated.

Upper Mississippi Basin.—Locally excessive rains of the thunderstorm type occurred in Monroe, Trempealeau, and Jackson Counties in Wisconsin from May 28 to 31. Previous general light showers from May 23 to 26 had saturated the ground. Flash floods resulted in the smaller tributary streams of the upper Black and Trempealeau Rivers. By far the most damaging flood occurred in the Beaver Creek area, a small tributary of the La Crosse River, draining an area of approximately 18 square miles. The creek runs directly through the business section of Sparta, Wis., where an enormous amount of damage occurred. One life was reported lost and property damage in Sparta has been estimated at more than a quarter of a million dollars. The total losses from the storm and the flood including La Crosse, Monroe, Trempealeau, Eau Claire, Chippewa, Jackson, and Buffalo counties are estimated at $400,000.

The flood producing rain appears to have begun about 8:25 p. m. of the 29th lasting until 2:10 a. m. of the 30th. The rainfall for the last 3 days of May at Sparta, Wis., was 2.70 inches; at Hatfield, Wis., 4.91 inches; at Blair, Wis., 2.60 inches; West Salem, Wis., 1.02 inches; and Neillsville, Wis. 4.35 inches. There are no authentic records of rainfall directly above Sparta in Beaver Creek but the fall must have exceeded 4 inches in a 2-hour period to produce the volume of run-off.

Ohio Basin.—On May 25–26 a flash flood occurred in the headwaters of the Clarion River, a tributary of the Allegheny River, which caused damage estimated at $75,000. Official records of rainfall show slightly over 2 inches over practically all of the upper Clarion Basin. Over a rather concentrated area between the east and west branches of the Clarion, in the northern portion of Elk County, Pa., unofficial measurements show 4 to 6.5 inches of rain during the afternoon and night of May 25.

Pacific Slope drainage.—Kings River at Piedra, Calif., was above flood stage on several days during the month as the result of melting snow at high levels. Waters in Lake Tulare in Kings County rose from rain in the mountains on May 4 and the run-off from melting snow causing flooding of reclaimed farm lands.

Additional information furnished by the Los Angeles County Flood Control District, relative to the heavy rainfall in southern California reported in the January issue of the REVIEW, indicates a record 24-hour rainfall recorded at one of their stations. At Camp LeRoy (formerly Hoegee's Camp) in Santa Anita Canyon near Arcadia, the total storm rainfall of 37.34 inches in 60 hours on January 21–23, and the maximum 24-hour rainfall of 25.83 inches exceeded all previous records in this region, and the 24-hour amount is greater than any previously recorded in the United States.

FLOOD-STAGE REPORT FOR MAY 1943

[All dates in May unless otherwise specified]

River and station	Flood stage	Above flood stages—dates From—	To—	Crest Stage	Date
ST. LAWRENCE DRAINAGE					
Lake Michigan					
Red Cedar:	*Feet*			*Feet*	
Williamston, Mich.	7	12	12	7.5	12
		21	22	7.5	21
		24	26	8.1	25
East Lansing, Mich.	8	12	13	8.1	13
		22	22	8.0	22
		25	27	8.7	26
Grand:					
Eaton Rapids, Mich.	6	20	22	6.5	21
		25	27	6.5	26
Lansing, Mich.	11	22	22	11.0	22
		26	26	11.1	26
Lake Huron					
Shiawassee: Owosso, Mich.	7	25	25	7.0	25
Flint: Columbiaville, Mich.	10	13	14	10.5	13
Lake Erie					
St. Marys: Decatur, Ind.	13	10	27	22.2	18
St. Joseph:					
Fort Wayne, Ind.	12	11	28	18.8	19
Montpelier, Ohio.	10	10	29	[3] 14.5	12
Maumee:					
Fort Wayne, Ind.	15	11	27	19.7	13
				22.2	19
Defiance, Ohio.	10	12	14	10.9	13
		17	23	16.8	19–20
Napoleon, Ohio.	10	13	13	10.0	13
		17	23	15.9	20
ATLANTIC SLOPE DRAINAGE					
Connecticut:					
South Newbury, Vt.	18	2	2	18.0	2
		8	15	22.4	13–14
Hartford, Conn.	16	13	16	17.6	14
Chenango: Oneonta, N. Y.	12	1	1	12.7	1
		11	14	13.8	11
		22	23	12.6	22
Chemung: Chemung, N. Y.	12	12	13	14.0	12
		22	22	12.8	22
Susquehanna: Vestal, N. Y.	14	13	13	14.6	13
		22	22	14.7	22
James: Columbia, Va.	10	22	22	11.1	22
		26	29	12.3	27
Roanoke: Williamston, N. C.	10	Apr. 24	3	11.1	Apr. 28–29
Savannah: Clyo, Ga.	11	Apr. 25	9	14.8	Apr. 29–30
Altamaha: Charlotte, Ga.	12	Apr. 26	4	13.6	2
EAST GULF OF MEXICO DRAINAGE					
Apalachicola: Blountstown, Fla.	15	27	29	15.5	28
MISSISSIPPI SYSTEM					
Upper Mississippi Basin					
Rock: Moline, Ill.	10	20	26	10.5	23
Skunk: Augusta, Iowa.	15	16	21	16.4	20
Middle: Indianola, Iowa.	15	16	16	15.6	16
Des Moines:					
Tracy, Iowa.	14	16	17	15.7	17
Eddyville, Iowa.	15	16	18	19.0	17
Ottumwa, Iowa.	9	16	18	10.6	17–18
Fox: Wayland, Mo.	15	17	18	16.3	17
Salt: New London, Mo.	19	16	21	27.2	19
Illinois:					
Morris, Ill.	13	11	27	21.6	21
Peru, Ill.	17	11	(1)	[3] 28.0	22
Peoria, Ill.	18	13	(1)	28.6	23
Havana, Ill.	14	3	(1)	27.3	25
Beardstown, Ill.	14	8	(1)	29.7	26–27
Bourbeuse: Union, Mo.	12	18	21	16.6	20
Meramec:					
Sullivan, Mo.	11	11	13	17.3	11–12
		18	22	20.1	20
Pacific, Mo.	11	11	15	18.5	14
		17	23	22.0	21
Valley Park, Mo.	14	12	15	22.8	13
		17	26	26.2	22
Mississippi:					
Keokuk, Iowa.	12	20	21	12.2	21
Gregory Landing, Mo.	12	18	22	12.9	21
Quincy, Ill.	14	(3)	2		
		17	23	16.5	21
Hannibal, Mo.	13	(3)	4		
		17	25	17.3	21
		(3)	6		
Louisiana, Mo.	12	8	10	12.5	9
		12	12	12.1	12
		15	25	17.6	21
Grafton, Ill.	18	17	(1)	29.0	24
Alton (Tailwater), Ill.	21	17	(1)	34.1	24
St. Louis, Mo.	30	18	31	38.9	24
Chester, Ill.	27	18	(1)	38.0	25
Cape Girardeau, Mo.	32	18	June 5	42.4	27

See footnotes at end of table.

FLOOD-STAGE REPORT FOR MAY 1943—Continued

River and station	Flood stage	Above flood stages—dates From—	To—	Crest Stage	Date
Missouri Basin	*Feet*			*Feet*	
Grand:					
Gallatin, Mo.	20	16	18	23.6	17
Chillicothe, Mo.	18	16	21	28.4	18
Brunswick, Mo.	12	17	23	15.5	20–21
Osage:					
Quenemo, Kans.	30	18	20	31.2	19
Ottawa, Kans.	24	18	20	26.1	19
La Cygne, Kans.	25	17	23	30.1	21
Trading Post, Kans.	24	18	24	27.8	19
Osceola, Mo.	20	10	(1)	28.7	13
				41.5	21
Lakeside, Mo.	60	10	(1)	62.3	13–14
				65.4	22
Tuscumbia, Mo.				[3] 48.5	20
St. Thomas, Mo.	23	12	(1)	43.7	20
Gasconade: Jerome, Mo.	15	11	14	19.7	12
		18	23	24.4	21
Missouri:					
Boonville, Mo.	21	18	23	23.5	20
Jefferson City, Mo.				27.8	21
Hermann, Mo.	21	12	12	21.2	12
		16	29	30.9	22
St. Charles, Mo.	25	12	(1)	26.3	13
				36.6	22
Ohio Basin					
Allegheny: Olean, N. Y.	10	26	28	12.1	27
Scioto: La Rue, Ohio.	11	18	19	[3] 12.0	19
West Fork of White:					
Anderson, Ind.	10	12	12	11.0	12
		18	21	19.0	18
Noblesville, Ind.	14	12	12	14.6	12
		18	20	20.1	19
Indianapolis, Ind.	12	18	20	16.8	19
Elliston, Ind.	18	12	28	30.0	21
Edwardsport, Ind.	12	11	June 1	25.0	22
East Fork of White: Seymour, Ind.	14	20	22	16.0	21
White:					
Petersburg, Ind.	16	12	31	24.3	23
Hazleton, Ind.	16	13	June 2	26.4	23
Wabash:					
Bluffton, Ind.	10	11	11	10.0	11
		14	14	10.0	14
		17	23	14.7	19
Wabash, Ind.	12	11	14	20.1	12
		17	23	24.2	18
		25	26	13.6	25
Logansport, Ind.	17	18	20	21.4	19
LaFayette, Ind.	11	12	30	28.4	19
Covington, Ind.	16	12	31	32.4	20
Terre Haute, Ind.	14	11	June 1	30.5	20
Vincennes, Ind.	14	12	June 5	27.0	22
Mt. Carmel, Ill.	17	12	June 5	27.5	25
New Harmony, Ind.	15	15	June 6	23.8	26
Ohio:					
Mt. Vernon, Ind.	35	29	30	35.1	29
Dam No. 49, Uniontown, Ky.	37	24	June 2	40.0	28
Shawneetown, Ill.	33	19	June 5	40.1	29
Dam No. 50, Fords Ferry, Ky.	34	18	June 6	42.3	29
Dam No. 51, Golconda, Ill.	40	29	31	40.3	30
Paducah, Ky.	39	27	June 2	40.7	30
Dam No. 52, Brookport, Ill.	37	22	June 6	43.5	31
Dam No. 53, Grand Chain, Ill.	42	19	June 7	52.1	30
Cairo, Ill.	40	16	June 10	51.0	30
White Basin					
Buffalo: Gilbert, Ark.	30	10	11	37.8	11
Current: Doniphan, Mo.	10	11	14	19.1	12
		19	21	13.7	20
Black:					
Leeper, Mo.	11	11	12	15.2	11
Poplar Bluff, Mo.	16	11	15	20.8	12
		21	23	17.5	21
Black Rock, Ark.	14	11	(1)	20.2	12
				23.5	19
Little Red: Heber Springs, Ark.	30	11	12	44.2	11
White:					
Cotter, Ark.	21	10	15	39.7	12
		20	23	28.5	21
Calico Rock, Ark.	19	10	16	46.8	11
		20	25	29.6	21
Batesville, Ark.	23	10	17	39.9	13
		20	25	32.0	22
Newport, Ark.	26	12	29	34.5	15
				31.0	23–24
Georgetown, Ark.	21	13	(1)	31.4	18
				29.3	26
Clarendon, Ark.	26	17	(1)	33.2	30–June 1
Arkansas Basin					
Walnut:					
Augusta, Kans.	20	17	20	26.7	19
Winfield, Kans.	23	18	21	39.7	19
Cimarron: Perkins, Okla.	11	18	21	14.4	20
Verdigris:					
Independence, Kans.				47.6	20
				27.4	26
Claremore, Okla.				46.6	14
				55.0	22

See footnotes at end of table.

FLOOD-STAGE REPORT FOR MAY 1943—Continued

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
Arkansas Basin—Continued					
Neosho:	*Feet*			*Feet*	
Burlington, Kans.	23	19	20	23	19–20
Iola, Kans.	15	17	21	20.7	19
Chanute, Kans.	20	17	22	28.9	19
Parsons, Kans.	22	10	12	24.2	11
		18	25	29.25	20
Oswego, Kans.	17	10	12	22.1	11
		18	26	25.8	21
North Canadian:					
Canton, Okla.	9	19	19	9.3	19
Yukon, Okla.	11	8	10	13.0	9
		16	21	14.5	19
Poteau: Potean, Okla.	21	10	16	37.0	12
		21	24	26.6	22
Petit Jean: Danville, Ark.	20	11	15	28.1	12
		17	19	22.1	18
Arkansas:					
Ralston, Okla.	16	19	22	18.4	20
Tulsa, Okla.	12	18	23	16.7	20
				38.5	11
Muskogee, Okla.	----------	----------	----------	48.4	21
				38.5	11
Webbers Falls, Okla.	23	9	30	40.4	22
Fort Smith, Ark.	22	10	31	41.7	12
				38.8	23
				38.1	12
Van Buren, Ark.	22	10	June 1	37.0	23
				38.4	14
Ozark, Ark.	22	11	31	38.4	24
				33.8	14
Dardanelle, Ark.	22	11	June 2	34.0	25
Morrilton, Ark.	20	11	June 3	30.8	15
				30.5	26
Little Rock, Ark.	23	12	June 3	28.4	17
				30.0	27–28
Pine Bluff, Ark.	25	13	June 4	32.8	17
				33.8	28

See footnotes at end of table.

FLOOD STAGE REPORT FOR MAY 1943—Continued

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
Lower Mississippi Basin					
	Feet			*Feet*	
Big Lake Outlet: Manila, Ark.	10	14	(1)	13.0	19–20
St. Francis:					
Fisk, Mo.	20	12	13	21.4	12–13
		21	June 1	22.0	24–25
St. Francis, Ark.	18	12	20	19.5	16
		27	(1)	19.2	31
Mississippi:					
New Madrid, Mo.	34	21	June 8	41.3	31
Memphis, Tenn.	34	29	June 10	37.8	June 5
WEST GULF OF MEXICO DRAINAGE					
Elm Fork of Trinity: Carrollton, Tex.	6	11	11	9.8	11
East Fork of Trinity: Rockwall, Tex.	10	12	14	11.9	13
		23	26	11.2	25
Trinity: Dallas, Tex.	28	28	June 1	13.8	29
		11	13	32.0	12
PACIFIC SLOPE DRAINAGE					
San Joaquin Basin					
		24	24	10.2	24
		24	25	10.8	25
Kings: Piedra, Calif.	10	25	26	11.0	26
		26	27	11.0	27
		27	28	11.0	28
Columbia Basin					
Clearwater: Kamiah, Idaho	14	29	29	14.0	29
Columbia: Vancouver, Wash.	15	(2)	5	----------	----------
		8	8	15.0	8
		29	(1)	----------	31

[1] Continued into June.
[2] Estimated.
[3] Continued from April.

CLIMATOLOGICAL DATA

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts see REVIEW January 1942, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section Average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	74.3	+2.9	Talladega	97	20	Scottsboro	40	2	3.74	−0.38	Clayton	6.85	Trafford	0.96
Arizona	67.6	+1.4	Parker	109	25	Fort Valley	15	17	.10	−.23	Tucson (Mag. Obsy.)	1.01	43 stations	.00
Arkansas	71.0	+1.8	2 stations	95	1 2	2 stations	38	1 1	7.89	+2.95	Rogers	19.03	Monticello	1.36
California	62.8	+1.4	Cow Creek	114	24	Ellery Lake	7	16	.35	−.60	Crescent City (near)	6.74	110 stations	.00
Colorado	51.1	−1.4	Las Animas	97	1 1	Spicer	5	9	2.40	+.52	Fort Collins	5.95	Box Ranch	.00
Florida	77.2	+1.7	2 stations	98	1 4	Hilliard	44	2	5.02	+1.09	Hialeah	12.89	Bradenton	.40
Georgia	72.8	+1.2	Camp Stewart	98	31	Clayton	32	2	4.25	+.83	Lumber City	8.03	Thomasville	1.71
Idaho	50.2	−2.8	Glenns Ferry	94	27	2 stations	12	1 11	1.43	−.24	Bungalow Ranger Sta.	5.20	Bonners Ferry	.06
Illinois	61.6	−1.2	E. St. Louis	95	5	do	26	1	8.79	+4.69	Edwardsville	14.90	Fulton L. & Dam	3.23
Indiana	62.4	+.1	5 stations	90	1 5	La Porte	22	1	8.71	+4.67	Covington	14.16	Jeffersonville	4.00
Iowa	57.5	−2.7	Hawarden	97	29	Decorah	21	1	4.40	+.36	Mt. Pleasant	7.07	Cresco	1.33
Kansas	60.9	−3.0	Lakin (near)	98	31	Goodland	29	12	4.61	+.80	Oswego	21.47	Ulysses	.67
Kentucky	67.3	+1.9	Pippapass	92	19	Pippapass	29	4	5.43	+1.50	Paducah	8.51	Hazard	3.14
Louisiana	77.0	+3.2	Winnfield	97	28	7 stations	51	26	3.58	−.99	Delta Farms	7.37	Coushatta	.96
Maryland-Delaware	64.3	+1.5	Cumberland, Md.	95	18	Oakland, Md.	17	2	4.67	+1.15	Conowingo Dam, Md.	7.82	Ocean City, Md.	1.95
Michigan	52.5	−1.8	3 stations	85	1 5	Baldwin	16	9	4.87	+1.62	Benton Harbor	13.66	Mancelona	.87
Minnesota	52.6	−2.6	Zumbrota	97	29	2 stations	20	1 8	4.42	+1.17	New Ulm	8.66	Argyle	1.93
Mississippi	75.4	+3.6	2 stations	96	1 5	Port Gibson	49	26	3.64	−.61	Meridian	8.86	Yazoo City	1.06
Missouri	63.9	−.6	Bragg City	95	5	Shelbina	33	1	9.91	+5.12	Joplin	25.54	Gallatin	4.15
Montana	48.7	−3.3	Forsyth	91	28	Kings Hill	5	12	1.56	−.56	Loweth	4.33	Winifred	.35
Nebraska	56.2	−3.1	Niobrara	100	29	Gordon	18	12	2.12	−1.26	Falls City	6.80	Lebanon	.49
Nevada	57.4	+1.7	2 stations	107	1 25	Sheldon	13	1 8	.31	−.54	Arthur	2.23	14 stations	.00
New England	55.0	−.2	Durham, N. H.	90	17	3 stations	20	1 2	5.07	+1.71	Searsburg Mtn., Vt.	10.31	Fort Kent, Maine	1.89
New Jersey	61.7	+1.3	2 stations	93	8	2 stations	24	2	4.92	+1.24	Moorestown	8.37	Cape May	1.45
New Mexico	60.8	+1.2	do	103	1 26	Gavilan	13	1 17	.98	−.26	Hassell	4.09	7 stations	.00
New York	56.1	.0	Bedford Hills	93	8	Stillwater Reservoir	17	2	5.50	+2.05	Williamstown	8.45	Riverhead	2.41
North Carolina	68.8	+2.2	Pinehurst	96	22	Mount Mitchell	19	1	3.67	−.29	Newbern	9.62	Louisburg	1.15
North Dakota	49.9	−3.6	2 stations	96	28	Dunseith	15	7	2.21	−.11	Milnor	5.17	New Hradec	.64
Ohio	61.2	+.6	Ironton	93	6	Van Wert	22	1	6.39	+2.68	Van Wert	12.45	Springfield No. 1	3.27
Oklahoma	66.8	−1.5	Hollis	103	2	Kenton	32	16	10.28	+5.53	Miami	23.95	Hooker	1.24
Oregon	50.7	−2.5	Brookings	99	24	Olive Lake	8	1 11	1.40	−.34	Brookings	6.36	Redmond	.10
Pennsylvania	60.4	+.7	Marcus Hook	93	7	Butler	19	1	6.08	+2.19	Gratersford	10.34	Woodward	3.50
South Carolina	72.0	+1.1	2 stations	98	31	Dillon	37	2	2.88	−.62	Caesars Head	10.79	Santuck	1.05
South Dakota	53.7	−2.7	do	102	28	Ralph	−1	12	2.35	−.51	Ardmore	7.32	Ludlow	.64
Tennessee	69.6	+2.7	Etowah	95	19	2 stations	29	2	4.09	.00	Cedar Hill	8.67	Dunlap	.85
Texas	73.7	+.7	2 stations	105	1 15	Stratford	33	16	4.25	+.61	San Benito	12.90	El Paso	T
Utah	54.8	−.7	Green River	98	22	Clear Creek	10	9	.91	−.29	Silver Lake (Brighton)	3.13	Bryce Canyon	.00
Virginia	66.6	+2.4	2 stations	96	7	Mountain Lake	21	2	4.34	+.65	Clifton Forge	6.74	Columbia	2.10
Washington	52.2	−2.8	do	91	24	Paradise Ranger Sta.	19	1 11	1.81	−.17	Highley Peak	9.55	White Swan	T
West Virginia	63.5	+1.7	do	96	1 7	Bayard	17	2	4.59	+.63	Dam 13, O. R.	8.49	2 stations	2.39
Wisconsin	54.1	−1.2	Lake Mills	89	29	2 stations	17	13	4.50	+.84	Stevens Point	7.24	Madison	2.25
Wyoming	47.4	−2.2	Torrington	95	28	Lake Yellowstone	0	17	2.10	+.06	Hecla	5.36	Big Piney	.33
Alaska [April]	29.0	+1.5	Unuk River	76	27	Kotzebue	−44	5	1.55	+.06	Baranof	13.89	4 stations	T
Hawaii	73.5	+1.4	2 stations	92	1 6	Volcano Observatory	48	6	7.97	+1.49	Kukui, Maui	35.00	Olowalu, Maui	.73
Puerto Rico	75.8	−1.0	Utuado	95	26	Mameyes (Utuado)	46	6	9.58	+1.42	Rio Blanco (500)	7.44	2 stations	1.40

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS

District and station	Elevation of instruments: Barometer above sea level	Thermometer above ground	Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Sea level, reduced to mean of 24 hours	Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Departure from normal	Maximum	Date	Mean maximum	Minimum	Date	Mean minimum	Greatest daily range	Mean temperature of the dewpoint	Mean relative humidity	Precipitation: Total	Departure from normal	Days with 0.01 inch or more	Wind: Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	° *F.*	° *F.*	°*F.*		°*F.*	°*F.*		°*F.*	°*F.*	° *F.*	%	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*	
New England							**53.9**	**+0.3**									**76**	**4.02**	**+0.9**										**6.6**			
Eastport	75	67	85	29.94	30.03	+0.07	48.4	+0.7	76	24	57	29	2	40	35	40	78	2.65	−0.4	13	8.9	sw.	34	e.	3	5	9	17	7.1	T	0.0	1
Greenville, Me	1,070	6	41	28.86	30.04	.....	49.8	+.2	81	17	62	22	2	37	41	40	...	3.60	+.4	11	.....	nw.	.....	.....	.....	2	12	17	.....	3.0	.0	0
Portland, Me [1]	103	5	36	29.90	30.03	+.06	52.8	.....	80	17	63	27	2	43	39	44	75	6.09	+2.7	14	8.4	s.	27	n.	5	8	11	12	5.7	.0	.0	3
Concord [2]	289	4	45	29.72	30.04	+.06	54.8	+.5	89	17	67	28	2	43	39	44	70	3.89	+.9	12	6.5	nw.	29	nw.	1	7	11	13	6.5	.0	.0	4
Burlington [2]	403	11	48	29.56	30.00	+.01	54.2	−2.3	77	24	63	27	1	45	...	45	71	4.35	+1.5	14	8.1	se.	30	se.	17	3	6	22	7.9	T	.0	2
Northfield	876	12	60	29.08	30.05	+.08	52.4	−.4	80	17	63	26	1	42	38	...	...	4.03	+1.3	15	7.0	sw.	25	s.	16	5	6	20	7.4	.1	.0	1
Boston [1]	124	33	62	29.88	30.03	+.03	57.6	.....	85	17	66	35	2	49	31	46	70	4.56	+1.4	16	10.4	nw.	33	ne.	22	4	11	16	6.9	.0	.0	4
Nantucket	12	10	63	30.02	30.04	+.05	53.6	+1.3	71	28	60	35	2	47	24	48	86	4.00	+1.2	12	11.4	sw.	35	ne.	22	6	10	15	6.6	.0	.0	7
Block Island	26	11	46	30.00	30.04	+.05	53.6	+.8	71	27	60	37	2	47	23	47	84	2.36	−1.1	13	14.5	sw.	42	nw.	1	14	7	10	4.4	.0	.0	2
Providence [2]	159	46	60	29.87	30.05	+.07	59.4	+.9	87	7	69	34	2	50	40	47	74	3.34	+.4	14	8.7	s.	30	se.	16	6	12	13	6.5	.0	.0	5
Hartford [1]	159	5	44	29.86	30.04	+.06	59.6	.....	85	7	70	30	2	49	37	49	71	5.31	+1.7	17	8.9	s.	32	w.	18	3	12	16	6.9	.0	.0	5
New Haven [2]	107	74	153	29.93	30.05	+.06	59.2	+1.3	88	7	68	37	2	51	38	50	80	4.05	+.4	18	8.8	s.	24	sw.	8	6	10	15	6.8	T	.0	8
Middle Atlantic States							**64.0**	**+1.8**									**72**	**4.53**	**+1.1**										**6.7**			
Albany [1]	97	26	40	29.91	30.03	+.05	57.8	+.1	84	17	68	32	1	48	38	47	71	3.78	+1.2	17	9.4	nw.	40	nw.	1	3	8	20	7.5	.0	.0	4
Binghamton	871	57	79	29.09	30.04	+.06	58.2	+.8	87	17	68	29	1	48	38	48	78	7.47	+4.2	19	6.1	w.	26	nw.	17	1	11	19	7.7	T	.0	7
New York	314	415	454	29.69	30.03	+.04	61.3	+.7	85	8	69	39	2	53	28	49	70	4.71	+1.5	16	14.2	n.	56	nw.	1	6	11	14	6.7	.0	.0	7
Harrisburg [1]	374	30	49	29.63	30.04	+.06	63.6	+1.8	90	6	73	36	2	54	41	52	72	6.24	+2.8	18	8.4	se.	27	nw.	1	3	12	16	7.4	.0	.0	8
Philadelphia [2]	114	174	367	29.92	30.05	+.06	63.3	+.4	89	8	73	37	2	53	35	52	71	5.63	+2.4	13	9.3	sw.	29	sw.	3	2	13	16	7.1	.0	.0	4
Reading	323	47	306	29.69	30.05	.....	63.5	+1.5	89	8	73	40	2	54	36	...	...	4.36	+.7	16	12.3	nw.	36	w.	3	3	12	16	7.2	.0	.0	9
Scranton	805	72	104	29.18	.....	.....	60.2	+.8	86	8	70	32	1	51	36	...	...	4.25	+1.0	17	6.4	n.	32	nw.	6	2	1	3	1	6	7.	0	T	0
Atlantic City	52	37	172	29.99	30.06	+.08	59.6	+1.5	90	7	66	41	2	53	30	51	80	2.42	−.6	13	16.0	s.	38	nw.	1	3	14	14	6.7	.0	.0	5
Trenton	190	89	107	29.83	30.04	.....	62.6	+1.5	87	7	72	39	2	53	31	51	71	4.28	+1.2	13	8.7	s.	26	nw.	1	4	13	14	7.0	.0	.0	5
Baltimore [2]	123	100	215	29.90	30.05	+.06	66.8	+2.4	90	8	75	44	2	58	32	54	72	4.76	+1.2	16	10.5	s.	34	nw.	3	3	16	12	6.8	.0	.0	10
Washington [2]	112	56	100	29.93	30.05	+.05	67.1	+3.4	90	6	77	37	2	57	40	55	71	4.04	+.3	18	7.6	s.	29	w.	8	1	15	15	6.9	.0	.0	9
Cape Henry	18	8	54	30.03	30.06	.....	68.6	+4.4	94	7	76	49	2	61	32	58	74	4.66	+1.1	8	12.2	sw.	35	n.	1	10	11	10	5.6	.0	.0	7
Lynchburg	686	144	184	29.33	30.05	+.05	68.6	+1.3	92	6	79	34	2	58	42	53	66	4.47	+.8	13	8.3	sw.	29	nw.	1	12	9	10	5.4	.0	.0	8
Norfolk [2]	91	80	125	29.97	30.08	+.08	70.3	+4.1	91	7	79	47	2	61	34	58	74	3.83	.0	9	10.5	sw.	27	sw.	11	8	9	14	6.1	.0	.0	6
Richmond [2]	144	11	52	29.89	30.05	+.06	69.2	+2.7	91	7	80	37	2	59	37	56	69	3.11	−.7	13	8.9	sw.	29	nw.	1	9	12	10	5.9	.0	.0	7
South Atlantic States							**72.3**	**+2.1**									**73**	**3.13**	**−0.3**										**5.3**			
Asheville	2,253	89	104	27.76	30.08	+.09	65.8	+3.2	89	31	77	35	2	55	38	52	68	3.96	+.5	15	8.1	se.	25	nw.	3	6	10	15	6.7	.0	.0	5
Charlotte [2]	779	63	86	29.25	30.08	+.09	71.4	+2.5	93	31	82	44	2	61	30	57	68	1.65	−2.0	8	7.6	sw.	22	sw.	11	8	12	11	6.2	.0	.0	1
Greensboro [1]	886	6	56	29.15	30.10	.....	68.3	.....	90	7	80	36	2	57	36	56	71	2.86	.....	13	8.9	sw.	26	sw.	11	6	14	11	6.1	.0	.0	7
Hatteras	11	5	50	30.07	30.09	+.08	69.8	+1.1	82	31	75	52	2	64	17	63	84	3.78	+.1	8	13.6	sw.	34	sw.	12	12	10	9	4.8	.0	.0	6
Raleigh [1]	376	27	69	29.68	30.08	+.09	71.0	+2.7	91	31	82	39	2	60	36	57	70	1.85	−2.0	7	9.6	sw.	32	sw.	10	7	13	11	5.8	.0	.0	4
Wilmington	72	73	107	30.01	30.09	+.08	71.6	+.8	88	31	79	50	2	64	22	62	78	3.61	+.2	10	10.2	sw.	33	s.	12	13	13	5	4.3	.0	.0	6
Charleston [2]	48	11	92	30.02	30.08	+.07	73.7	+1.0	92	28	80	56	2	67	23	64	80	2.79	−.2	9	11.1	s.	29	s.	11	19	8	4	3.6	.0	.0	4
Columbia, S. C. [2]	347	70	91	29.69	30.07	+.07	73.7	+1.8	93	31	84	47	2	63	29	62	73	5.07	+2.0	11	8.2	s.	26	s.	25	11	9	11	5.3	.0	.0	8
Greenville, S. C. [1]	1,040	70	78	28.98	30.07	.....	70.8	+3.6	90	20	81	48	2	61	33	55	65	2.01	−2.0	9	9.4	sw.	38	n.	1	8	10	13	6.1	.0	.0	3
Augusta [2]	182	62	77	29.87	30.07	+.08	74.4	+2.0	92	31	85	50	2	64	30	58	63	2.42	−.6	9	5.9	s.	21	s.	11	7	14	10	5.3	.0	.0	3
Savannah [2]	65	73	152	30.01	30.08	+.08	75.6	+2.2	93	31	84	57	2	67	28	64	75	2.33	−.7	10	10.6	s.	25	e.	23	13	14	4	4.2	.0	.0	5
Jacksonville [2]	43	86	110	30.02	30.08	+.08	77.2	+2.2	93	31	85	64	3	69	24	66	76	4.91	+.9	10	7.9	e.	23	sw.	11	11	8	12	5.4	.0	.0	8
Forida Peninsula							**78.8**	**+1.5**									**77**	**2.36**	**−1.9**										**4.8**			
Key West [2]	21	10	64	30.00	30.03	+.06	80.4	+1.3	88	26	85	70	2	76	13	69	73	1.71	−1.8	9	10.0	e.	23	e.	6	15	16	9	4.0	.0	.0	7
Miami [2]	25	124	168	30.01	30.05	+.06	76.7	+.3	86	25	80	67	1	73	13	70	81	3.32	−2.9	11	12.3	e.	35	ne.	17	8	16	7	5.4	.0	.0	7
Tampa [1]	35	5	61	30.01	30.05	+.06	79.2	+2.9	93	28	88	63	3	70	25	69	77	2.05	−.9	9	10.2	e.	29	sw.	26	10	13	8	5.0	.0	.0	13
East Gulf States							**75.3**	**+2.6**									**73**	**4.15**	**+0.3**										**4.8**			
Atlanta [1]	1,173	5	72	28.84	30.05	+.06	72.0	+1.7	90	14	82	49	2	62	30	57	66	3.75	+.3	6	9.4	s.	44	s.	11	9	13	9	5.5	.0	.0	5
Macon [2]	370	70	87	29.66	30.06	+.07	73.3	+1.0	91	14	84	51	2	63	32	60	71	5.79	+2.8	8	6.6	s.	27	se.	11	13	11	7	4.3	.0	.0	5
Thomasville	273	49	58	29.78	30.10	+.11	76.4	+2.4	94	31	87	57	2	66	29	...	...	1.71	−1.9	6	.....	.....	.....	.....	.....	8	12	11	.....	.0	.0	5
Apalachicola	35	11	51	30.00	30.04	.....	76.4	+1.8	89	1	83	62	3	70	20	68	79	7.92	+4.5	7	8.5	se.	26	e.	18	14	7	10	4.9	.0	.0	4
Pensacola	56	54	79	29.97	30.04	+.05	76.8	+2.9	91	28	84	63	5	70	21	68	78	2.91	−.5	4	8.0	se.	26	sw.	11	13	10	8	4.6	.0	.0	6
Anniston	741	9	...	.....	.....	.....	72.2	+3.8	91	20	84	48	4	60	37	...	...	5.43	+1.5	7	.....	se.	.....	.....	.....	17	7	7	.....	.0	.0	3
Birmingham [2]	700	11	48	29.31	30.04	+.06	73.2	+2.1	90	19	83	52	22	63	32	58	64	2.04	−1.9	5	7.3	s.	24	s.	10	8	15	8	5.3	.0	.0	5
Mobile [2]	57	6	30	29.97	30.03	+.04	77.0	+2.6	91	29	85	62	2	69	23	67	79	4.39	+.1	6	6.5	s.	20	w.	11	15	6	10	4.5	.0	.0	9
Montgomery [2]	218	92	105	29.80	30.04	+.05	75.6	+2.2	92	20	86	56	2	66	28	61	67	3.07	−.8	7	6.9	s.	19	sw.	11	12	9	10	4.7	.0	.0	5
Meridian [2]	375	67	92	29.62	30.03	+.05	75.4	+4.1	94	20	87	55	2	64	33	63	73	8.86	+4.5	8	6.5	s.	29	sw.	8	10	8	13	5.1	.0	.0	6
Vicksburg [2]	247	82	102	29.73	30.00	+.03	76.6	+3.7	92	14	86	60	22	67	26	64	80	2.00	−2.3	9	8.6	s.	24	s.	7	9	14	8	5.0	.0	.0	8
New Orleans [6]	53	76	84	29.96	30.01	+.04	78.8	+3.4	92	29	88	63	11	70	24	68	75	1.92	−2.7	7	6.7	se.	17	s.	10	15	11	5	4.2	.0	.0	6
West Gulf States							**75.0**	**+1.9**									**76**	**6.33**	**+2.1**										**6.0**			
Shreveport [1]	249	5	64	29.70	29.96	+.01	76.4	+3.8	94	2	86	58	12	66	30	64	71	2.41	−1.8	7	10.3	s.	33	s.	10	9	11	11	5.2	.0	.0	7
Bentonville	1,303	12	51	28.60	.....	.....	65.8	−.6	92	2	75	46	8	56	34	...	...	16.89	+11.7	15	7.3	s.	25	sw.	5	8	17	6	.....	.0	.0	12
Fort Smith	463	57	82	29.44	29.91	−.02	70.8	+1.2	93	2	79	54	8	63	33	59	71	14.71	+9.9	12	8.1	e.	31	se.	8	4	10	17	7.1	.0	.0	10
Little Rock [1]	357	94	102	29.59	29.97	+.02	72.6	+2.3	92	2	82	56	21	63	36	61	73	4.41	−.4	13	9.4	s.	32	sw.	10	6	9	16	6.8	.0	.0	9
Austin [1]	605	11	41	29.27	29.89	.....	76.0	+1.4	92	27	87	54	11	65	36	65	74	5.38	+.7	9	11.2	s.	31	se.	9	8	13	10	5.6	.0	.0	8
Brownsville [2]	57	88	96	29.82	29.87	.....	80.2	+1.6	93	24	88	59	11	72	33	71	82	5.46	+2.9	6	14.9	se.	36	se.	28	4	6	21	7.3	.0	.0	6
Corpus Christi [1]	20	11	78	29.88	29.90	.00	78.0	+3.5	91	24	86	58	11	70	30	70	83	4.95	.....	7	14.3	se.	30	s.	5	5	16	10	5.9	.0	.0	6
Dallas [1]	512	6	46	29.37	29.90	.....	74.0	.....	96	2	84	54	13	64	34	62	71	5.00	+.5	11	13.6	se.	45	se.	15	8	6	17	6.1	.0	.0	9
Fort Worth [1]	679	35	56	29.20	29.91	.00	73.4	+1.2	95	2	84	53	13	63	34	61	72	7.83	+3.2	11	13.5	s.	49	nw.	7	8	8	15	6.1	.0	.0	12
Galveston [2]	54	106	114	29.90	29.95	+.01	77.7	+2.9	86	1	82	66	24	74	18	71	84	1.05	−2.4	8	12.5	se.	37	nw.	24	9	11	11	5.5	.0	.0	6
Houston [3]	138	157	190	29.81	29.94	.....	77.2	+1.7	92	23	86	61	7	69	26	68	81	6.27	+1.8	10	11.9	se.	36	se.	7	9	14	8	5.4	.0	.0	4
Palestine	510	64	72	29.42	29.94	+.01	74.8	+2.1	91	3	84	57	11	65	29	64	75	7.58	+3.0	8	8.6	s.	35	nw.	24	7	14	10	5.7	.0	.0	7
Port Arthur	34	59	134	29.93	29.96	.....	78.4	.....	90	20	85	62	11	72	23	69	77	2.77	−1.4	5	14.4	s.	42	n.	24	10	10	11	5.3	.0	.0	5
San Antonio [1]	693	28	59	29.18	29.89	−.01	77.2	+2.1	95	24	88	55	11	67	39	64	70	2.56	−.6	8	11.6	se.	36	se.	28	7	11	13	6.0	.0	.0	6
Ohio Valley and Tennessee							**65.3**	**+1.1**									**73**	**5.65**	**+1.8**										**6.8**			
Chattanooga [1]	762	21	54	29.24	30.04	+.05	69.3	+3.8	91	19	82	40	2	57	40	57	70	1.5[6]	−2.2	7	7.8	s.	31	s.	11	7	12	12	5.9	.0	.0	4
Knoxville [2]	995	66	84	29.01	30.05	+.06	69.8	+2.6	91	20	81	37	2	58	42	55	64	2.8[8]	−.9	8	8.7	sw.	35	w.	11	10	16	5	4.8	.0	.0	6
Memphis [2]	399	78	86	29.57	29.98	+.02	73.0	+2.4	91	5	82	55	1	64	33	61	71	6.0[2]	+1.8	12	8.5	s.	27	w.	19	6	12	13	6.2	.0	.0	10
Nashville [1]	546	5	72	29.44	30.02	+.04	70.8	.....	89	6	81	44	2	60	38	58	70	5.2[9]	+1.4	11	9.5	s.	26	sw.	31	7	15	9	5.7	.0	.0	9
Lexington	989	6	...	28.99	.....	.....	66.4	+2.1	88	6	78	35	4	55	38	...	...	6.7[3]	+2.9	16	.....	s.	.....	.....	.....	8	12	11	.....	.0	.0	12
Louisville	525	106	120	29.44	30.01	+.03	68.0	+1.4	87	5	77	39	1	59	35	56	72	4.9[1]	+1.2	17	10.0	s.	34	sw.	6	7	11	13	6.0	.0	.0	9
Evansville [1]	431	5	38	29.53	29.99	+.02	66.5	+2.2	88	5	76	42	1	57	38	56	73	6.3[0]	+2.4	14	9.4	s.	27	s.	6	7	6	18	7.2	.0	.0	12
Indianapolis [1]	823	98	129	29.11	29.99	+.02	61.2	−.2	85	5	70	30	1	52	38	53	78	10.1[0]	+6.2	16	10.9	sw.	38	sw.	6	3	9	19	7.6	.0	.0	12
Terre Haute [2]	575	68	149	29.38	29.99	.....	63.6	+.2	87	5	72	35	1	55	33	54	77	11.9[4]	+8.1	16	9.8	sw.	29	s.	16	7	6	18	7.2	.0	.0	10
Cincinnati [2]	627	11	51	29.34	30.01	+.02	64.8	−1.7	88	6	74	32	1	55	29	54	74	5.0[8]	+1.4	20	7.8	sw.	27	sw.	6	7	4	20	7.3	.0	.0	11
Columbus [2]	822	90	110	29.14	30.01	+.03	63.4	+1.1	87	6	72	31	1	54	28	52	74	4.3[3]	+.7	17	10.6	s.	39	sw.	6	5	10	16	7.4	.0	.0	9
Dayton [2]	900	186	213	29.05	30.00	.....	61.4	−1.2	84	6	70	28	1	52	32	52	77	4.66	+1.1	20	10.8	sw.	42	sw.	6	2	7	22	7.9	.0	.0	10
Elkins [2]	1,947	61	78	29.03	30.06	+.06	61.0	+1.8	86	17	72	24	2	50	44	51	75	3.72	−.3	18	7.1	s.	29	w.	3	0	10	21	7.9	.0	.0	10
Parkersburg	637	77	84	29.35	30.03	+.04	65.1	+1.3	90	6	76	34	2	54	34	54	72	5.53	+2.2	19	6.2	se.	30	nw.	19	6	9	16	6.7	.0	.0	12
Pittsburgh [1]	842	39	54	29.13	30.04	+.05	61.1	−.1	86	6	71	32	1	52	31	50	72	5.63	+1.4	20	11.5	s.	35	sw.	8	2	9	20	7.7	T	.0	6

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Temperature of the air: Mean temperature of the dewpoint	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	°F.	°F.	°F.		°F.	°F.		°F.	°F.	°F.	%	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*	
Lower Lake Region							56.2	−0.9									75	6.17	+3.0										7.5			
Buffalo [2]	768	243	280	29.19	30.02	+.05	51.8	−2.8	75	23	59	28	1	44	26	46	78	3.52	+.4	18	13.7	sw.	44	w.	6	3	7	21	7.7	T	.0	7
Canton	448	10	61	29.51	29.99	.....	55.0	−1.2	77	31	64	25	1	46	33	44	70	5.86	+2.9	15	8.4	sw.	29	sw.	16	4	9	18	7.4	.2	.0	3
Ithaca	836	77	100	.....	.....	.....	56.8	−.7	86	6	66	28	1	47	35	.....	.....	5.85	+2.4	19	9.0	nw.	31	nw.	8	1	5	25	8.4	T	.0	7
Oswego	335	71	85	29.64	30.02	+.05	53.0	−2.2	77	23	60	28	1	46	26	44	72	4.92	+1.9	18	8.5	w.	32	se.	16	6	9	16	6.9	.4	.0	4
Rochester [1]	523	5	69	29.45	30.02	+.05	56.2	+.1	82	6	65	30	1	47	31	47	74	5.45	+2.5	16	9.8	w.	37	w.	6	2	8	21	7.8	T	.0	5
Syracuse [1]	596	5	51	29.37	30.02	+.04	56.8	+.5	81	6	66	29	1	47	32	48	74	3.88	+.9	19	9.9	sw.	36	s.	16	2	7	22	8.1	.5	.0	5
Erie [2]	714	57	81	29.26	30.03	+.05	55.6	−1.2	83	6	63	32	1	48	33	48	80	6.41	+3.0	19	8.1	w.	27	se.	16	4	7	20	7.4	.0	.0	3
Cleveland [1]	762	27	54	29.19	30.01	+.03	58.1	.0	84	6	67	32	14	49	37	49	74	4.64	+1.5	20	11.0	se.	41	sw.	6	5	7	19	7.8	T	.0	9
Sandusky	629	5	67	.....	.....	.....	58.8	−.4	84	6	67	34	1	50	29	.....	.....	9.04	+5.9	20	8.9	sw.	31	sw.	16	6	6	19	7.6	.0	.0	7
Toledo [2]	628	79	87	29.32	30.00	+.03	57.7	−1.7	84	6	67	29	1	48	35	50	80	8.04	+4.6	18	11.7	sw.	43	sw.	16	9	7	15	6.1	.0	.0	9
Fort Wayne [1]	857	69	84	29.07	29.99	.....	58.3	−.9	83	29	68	29	1	49	31	50	77	8.40	+4.6	17	9.4	w.	34	s.	16	3	9	19	7.5	.0	.0	9
Detroit [1]	730	5	78	29.22	30.01	+.04	56.6	−.3	81	6	65	30	1	48	33	47	74	8.05	+4.8	19	9.8	w.	36	sw.	16	5	7	19	7.6	.0	.0	5
Upper Lake Region							52.3	−0.2									73	4.28	+1.1										7.3			
Alpena	609	5	89	29.33	29.99	+.02	50.2	−.3	78	6	59	28	1	42	34	40	73	2.44	−.6	12	10.9	se.	36	sw.	16	4	8	19	7.4	T	.0	5
Escanaba	612	51	72	29.30	29.96	−.01	50.0	+.4	75	21	58	29	13	42	29	41	75	3.63	+.7	11	10.0	s.	33	n.	11	4	8	19	7.3	T	.0	0
Grand Rapids [2]	707	70	244	29.22	29.98	+.01	56.2	−1.8	81	22	64	30	1	48	31	45	75	4.67	+1.2	20	11.5	sw.	48	sw.	16	4	7	20	7.4	.0	.0	5
Lansing [2]	878	5	90	29.06	30.00	.....	54.8	−2.1	76	22	63	27	1	46	35	47	77	7.98	+4.6	19	9.1	w.	32	sw.	16	5	9	17	7.2	.0	.0	4
Ludington	637	60	66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marquette	734	44	73	29.15	29.96	−.01	49.8	+.8	74	29	58	29	13	42	27	40	70	2.87	−.1	10	7.8	e.	34	s.	5	5	9	17	6.9	T	.0	2
Sault Saint Marie [1]	614	11	43	29.19	29.99	+.04	48.2	.0	79	23	59	25	1	38	39	39	75	3.89	+1.2	10	11.7	nw.	40	sw.	6	6	7	18	7.1	T	.0	2
Chicago [1]	673	19	38	29.25	29.98	+.02	56.6	−1.2	87	31	65	30	1	48	32	46	74	7.08	+3.6	16	10.3	ne.	35	sw.	16	3	12	16	7.4	.0	.0	4
Green Bay	617	109	141	29.29	29.96	+.01	54.6	−.3	82	22	64	32	1	45	31	45	74	4.44	+.9	14	10.3	s.	39	sw.	16	2	11	18	7.7	.0	.0	5
Milwaukee [1]	681	33	66	29.24	29.98	+.02	52.8	+.2	84	5	62	29	1	44	39	42	71	2.88	−.5	20	13.1	n.	50	sw.	16	3	7	21	7.7	.0	.0	5
Duluth	1,133	5	47	28.71	29.93	−.03	50.0	+2.7	80	21	61	29	8	40	36	38	69	2.90	−.4	14	11.4	ne.	39	ne.	15	4	13	14	6.7	T	.0	3
North Dakota							50.6	−3.0									64	2.39	0.0										6.8			
Fargo [1]	940	5	43	28.90	29.92	−.02	51.2	−3.9	81	28	63	28	7	40	40	39	68	3.65	+.8	10	14.9	n.	42	w.	2	7	8	16	6.5	T	.0	3
Bismarck [1]	1,677	4	41	28.16	29.94	+.02	51.4	−1.6	94	28	64	22	7	39	46	37	62	2.05	−.3	5	12.8	nw.	38	w.	23	7	10	14	6.5	T	.0	2
Devils Lake	1,478	11	44	28.36	29.94	.00	49.0	−3.6	84	22	60	23	7	39	34	36	67	2.21	+.2	12	10.2	sw.	34	nw.	2	3	6	22	8.0	.2	.0	3
Lemmon, S. Dak	2,602	4	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Forks	832	11	71	29.03	29.94	.....	49.6	.....	83	22	62	25	8	37	43	38	.....	2.66	.....	11	.....	n.	.....	.....	.....	6	7	18	.....	T	.0	2
Williston	1,878	42	50	27.95	29.94	+.01	50.9	−3.1	82	21	62	29	14	40	35	35	61	1.29	−.8	12	8.6	se.	32	w.	1	8	11	12	6.1	.2	.0	0
Upper Mississippi Valley							59.2	−2.3									73	5.36	+1.3										7.2			
Minneapolis-St. Paul, Minn. [1]	919	32	61	28.94	29.93	−.01	55.6	−2.1	88	29	66	31	13	45	40	44	70	4.27	+.6	15	11.1	se.	37	w.	6	3	7	21	7.6	T	.0	7
Springfield, Minn	1,025	4	42	28.83	29.93	.....	55.0	.....	94	29	66	30	7	44	41	42	66	6.73	.....	15	.....	w.	.....	.....	.....	4	11	16	.....	T	.0	3
La Crosse [2]	714	11	48	29.17	29.95	+.01	55.4	−3.9	86	29	65	28	1	45	42	45	73	3.26	−.5	14	10.2	se.	45	e.	15	3	11	17	7.3	.0	.0	6
Madison [2]	974	70	78	28.92	29.97	+.01	55.2	−2.4	82	29	63	35	1	48	31	45	72	2.25	−1.6	16	8.5	sw.	28	sw.	5	1	10	20	7.9	.0	.0	7
Charles City	1,015	10	51	28.89	.....	.....	55.7	−2.1	90	29	66	30	1	46	39	.....	.....	2.45	−1.9	10	7.6	n.	26	sw.	15	7	10	14	6.2	.0	.0	2
Davenport [2]	606	66	161	29.32	29.98	+.03	59.0	−2.3	89	29	67	39	1	51	34	48	71	5.76	+1.8	17	10.8	ne.	27	se.	15	4	7	20	7.5	.0	.0	5
Des Moines [2]	860	5	99	29.03	29.95	+.02	58.3	−3.0	91	29	67	38	1	50	33	47	72	3.92	−.6	9	10.9	n.	33	sw.	5	5	8	18	6.9	.0	.0	4
Dubuque	699	60	79	29.22	29.97	+.02	57.6	−2.7	89	29	66	35	1	49	36	45	67	2.81	−1.4	15	6.6	s.	21	nw.	2	3	8	20	7.7	.0	.0	3
Burlington, Iowa [1]	702	6	35	29.20	29.96	+.02	58.6	−4.0	88	29	67	37	1	50	35	48	75	5.35	+1.2	19	9.4	n.	40	s.	2	5	7	19	7.1	.0	.0	6
Cairo	357	5	99	29.61	.....	.....	69.4	+1.0	91	5	78	48	1	60	36	.....	.....	6.11	+2.4	15	8.9	s.	28	sw.	6	2	11	18	7.6	.0	.0	10
Peoria [2]	609	11	45	29.32	29.98	+.02	58.8	−2.9	90	5	68	34	1	50	36	51	77	7.35	+3.3	15	10.0	sw.	35	w.	16	10	4	17	6.6	.0	.0	5
Springfield, Ill. [2]	636	5	191	29.29	29.97	+.02	62.2	−1.0	93	5	71	37	1	54	39	53	79	10.60	+6.2	13	11.4	s.	29	s.	15	6	6	19	7.5	.0	.0	7
St. Louis [2]	568	179	303	29.36	29.97	+.02	64.4	−2.6	92	5	72	43	1	57	38	55	76	10.20	+5.9	19	11.6	sw.	33	sw.	5	7	6	18	7.0	.0	.0	10
Missouri Valley							59.1	−2.3									69	6.09	+2.0										7.1			
Columbia, Mo. [2]	784	6	66	29.11	29.94	.00	63.0	−1.3	91	5	72	44	21	54	30	52	76	13.34	+8.9	19	7.7	s.	24	sw.	4	3	12	16	7.1	.0	.0	10
Kansas City [1]	963	38	76	28.92	29.95	+.03	62.6	.....	89	4	71	43	8	54	33	50	69	4.71	+.1	15	11.2	ne.	39	sw.	5	3	9	19	7.2	.0	.0	10
St. Joseph [2]	967	11	49	28.92	29.94	.....	61.0	−3.2	88	5	70	40	7	52	29	49	70	6.32	+1.6	15	9.2	s.	43	w.	15	10	9	12	5.7	.0	.0	7
Springfield, Mo. [1]	1,324	5	60	28.56	29.94	+.01	63.2	−.5	86	5	72	45	8	55	30	55	80	16.15	+11.0	20	11.1	s.	35	sw.	2	5	9	17	7.2	.0	.0	16
Topeka	987	65	87	28.89	29.94	.....	62.2	−2.1	92	4	71	42	8	53	36	50	72	4.93	+.4	17	9.7	n.	33	s.	5	7	5	19	6.9	.0	.0	7
Lincoln [2]	1,189	11	81	28.69	29.93	+.02	59.2	−2.5	91	29	70	35	12	49	36	45	66	3.43	−.6	10	10.2	s.	37	nw.	15	4	9	18	7.2	.0	.0	5
Omaha [1]	1,105	31	44	28.78	29.94	+.02	58.9	−3.5	93	29	68	37	8	50	34	47	70	4.27	+.5	12	12.5	s.	43	nw.	5	3	9	19	7.6	.0	.0	6
Valentine	2,598	46	54	27.26	29.97	+.07	53.5	−2.7	94	28	66	25	13	42	40	36	57	1.38	−1.4	7	9.8	n.	34	s.	1	4	7	20	7.4	T	.0	6
Sioux City [1]	1,138	5	27	28.73	29.94	+.02	57.3	−2.4	95	29	69	33	8	45	39	44	65	3.66	−.4	10	11.9	nw.	44	w.	31	3	12	16	7.4	T	.0	6
Huron [1]	1,301	5	41	28.55	29.94	+.02	53.5	−2.9	98	28	67	20	7	40	43	42	68	2.70	−.3	9	14.7	s.	46	s.	1	2	13	16	7.1	.0	.0	4
Northern Slope							51.2	−2.7									63	2.08	−0.2										7.2			
Billings [1]	3,570	18	39	26.29	29.94	.....	51.2	−4.9	85	27	61	26	12	41	35	34	59	1.24	.....	13	10.9	sw.	44	nw.	1	4	10	17	7.1	5.5	.0	6
Havre	2,507	11	67	27.33	29.96	+.06	51.8	−1.6	83	29	65	24	12	39	40	34	58	1.02	−1.0	9	8.3	sw.	31	nw.	1	2	16	13	7.0	T	.0	3
Helena [1]	4,124	5	35	25.79	29.90	+.06	49.0	−2.6	82	27	60	22	12	38	40	33	60	.67	−1.3	14	10.0	w.	39	w.	6	3	9	19	7.3	T	.0	7
Missoula [2]	3,205	80	91	26.65	30.03	.....	50.0	−2.8	77	20	61	30	13	39	37	35	66	1.93	.0	16	6.7	w.	25	w.	4	7	10	14	6.5	.9	.0	2
Kalispell	2,973	48	56	26.93	29.97	+.09	48.8	−2.6	73	29	59	26	12	39	31	35	64	1.16	−.3	10	6.1	w.	25	sw.	9	1	12	18	7.4	T	.0	3
Miles City [2]	2,371	48	55	27.46	29.95	+.04	53.8	−2.9	89	27	67	24	12	41	39	37	62	1.38	.....	10	.....	s.	.....	.....	.....	6	5	20	.....	.9	.0	3
Rapid City [2]	3,259	50	58	26.58	29.93	+.03	51.8	−2.2	93	28	65	22	12	39	45	35	60	1.89	−1.0	10	14.8	nw.	61	nw.	24	6	10	15	7.0	T	.0	5
Cheyenne [1]	6,094	5	39	23.96	29.90	+.05	47.2	.....	85	28	59	23	12	36	42	36	74	4.21	+1.8	17	10.3	nw.	42	w.	1	3	10	18	7.5	3.4	.0	4
Lander	5,352	60	68	24.61	29.88	.00	49.8	−1.4	85	28	62	23	9	37	39	32	57	1.82	−.4	8	5.9	sw.	27	w.	1	3	12	16	7.2	11.9	.0	2
Sheridan [2]	3,790	6	42	26.09	29.95	.....	49.6	−2.6	85	27	61	21	12	38	39	35	65	3.98	+1.3	15	9.4	nw.	45	nw.	1	3	9	19	7.6	11.0	.0	2
North Platte [2]	2,821	11	51	27.02	29.92	+.04	55.7	−3.0	92	29	68	29	12	44	48	41	67	2.04	−.7	11	8.0	s.	27	se.	14	4	7	20	7.5	.0	.0	6
Middle Slope							60.3	−2.8									71	6.76	+3.1										7.1			
Denver [2]	5,292	106	113	24.69	29.90	+.06	52.8	−3.4	85	28	64	30	12	42	39	37	66	3.22	+1.0	15	7.2	s.	32	nw.	6	4	8	19	7.4	2.0	.0	5
Pueblo [1]	4,690	5	36	25.23	29.86	+.03	56.2	−2.7	91	1	70	33	9	42	50	38	64	3.18	+1.6	15	8.3	e.	42	w.	4	3	9	19	7.3	1.0	.0	11
Concordia	1,392	50	58	28.49	29.95	+.04	59.6	−3.6	90	4	69	36	12	50	38	48	70	5.41	+1.2	12	8.6	ne.	26	nw.	5	5	7	19	7.2	.0	.0	6
Dodge City [1]	2,509	10	86	27.33	29.89	+.02	59.8	−3.7	95	31	72	34	8	47	46	46	69	1.13	−1.8	14	16.5	se.	47	n.	23	5	11	15	6.8	.0	.0	11
Wichita [1]	1,358	6	64	28.50	29.92	+.02	61.2	−3.9	90	4	70	41	12	52	36	51	76	6.59	+2.1	17	15.8	se.	47	s.	5	3	11	17	7.3	.0	.0	13
Oklahoma City [2]	1,214	10	47	28.64	29.89	.00	65.8	−1.9	94	2	75	44	13	57	34	55	75	9.76	+4.9	13	9.7	s.	26	s.	5	7	9	15	6.5	.0	.0	10
Tulsa	674	10	61	29.20	29.91	.....	66.9	−.4	94	2	76	46	1	58	35	58	77	18.00	+13.0	13	12.2	s.	43	s.	16	4	8	19	7.5	.0	.0	14

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean temperature of the dewpoint	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	° *F.*	° *F.*	°*F.*		°*F.*	°*F.*		°*F.*	°*F.*	°*F.*	%	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*	
Southern Slope							70.2	−0.4									60	2.96	+0.3										5.5			
Abilene [2]	1,738	10	56	28.09	29.85	−.02	71.8	−.2	98	7	83	48	13	60	40	58	70	4.00	.0	11	11.4	s.	32	sw.	6	10	7	14	5.8	.0	.0	9
Amarillo [2]	3,676	10	49	26.21	29.86	−.02	62.2	−1.9	90	31	74	38	13	50	42	43	61	1.82	−1.0	9	16.9	se.	46	s.	25	10	8	13	5.4	.0	.0	12
Del Rio	960	63	71	28.85	29.80	−.05	78.6	+1.6	98	7	89	57	11	68	38	63	64	4.87	+2.0	10	11.5	se.	32	se.	9	7	11	13	5.9	.0	.0	10
Roswell	3,566	85	95	26.28	29.81	−.01	68.3	−1.1	95	2	84	43	16	53	49	39	45	1.17	+.1	6	9.0	s.	31	n.	24	13	8	10	4.8	.0	.0	7
Southern Plateau							72.8	+3.3									28	0.38	+0.2										2.8			
El Paso [1]	3,778	82	101	26.07	29.74	−.04	72.6	+2.6	97	26	88	44	10	57	42	32	29	T	−.3	0	12.1	sw.	45	sw.	14	16	11	4	3.2	.0	.0	4
Albuquerque [1]	5,314	5	45	24.66	29.74	.....	65.8	+2.5	90	3	80	39	10	52	38	32	37	1.41	+.8	5	11.1	w.	46	w.	20	13	9	7	4.2	.0	.0	6
Phoenix [1]	1,107	39	87	28.63	29.74	−.04	79.0	+4.0	104	25	94	49	17	64	38	34	25	T	−.1	0	6.3	e.	28	sw.	14	22	5	4	2.7	.0	.0	2
Tucson [1]	2,555	5	23	27.23	29.75	.....	76.3	.....	101	26	93	47	17	59	43	27	19	.89	+.7	1	.....	w.	.....	.....	.....	21	5	5	2.7	.0	.0	1
Yuma	142	9	54	29.63	29.75	−.04	79.9	+3.7	108	25	97	50	17	62	44	41	32	.00	.0	0	6.7	s.	29	n.	8	28	3	0	1.0	.0	.0	0
Independence	3,957	5	26	25.93	29.89	−.05	66.8	+3.8	93	24	81	38	16	53	36	30	28	.00	−.2	0	.....	n.	.....	.....	.....	21	9	1	.....	.0	.0	0
Middle Plateau							56.5	+0.9									43	0.38	−0.5										5.1			
Reno [2]	4,527	61	76	25.47	29.96	+.05	55.0	+.8	92	25	73	24	8	37	53	31	50	T	−.6	0	8.1	nw.	34	nw.	5	13	10	8	4.5	T	.0	0
Tonopah	6,090	9	20	24.02	29.86	.....	56.8	+1.5	85	26	69	26	16	44	31	25	34	T	−.4	0	.....	nw.	.....	.....	.....	16	13	2	.....	T	.0	0
Winnemucca	4,339	5	56	25.60	29.94	+.03	54.9	+1.0	89	27	70	27	8	40	44	30	46	.37	−.5	6	7.6	sw.	29	w.	10	10	14	7	4.7	T	.0	1
Modena	5,473	10	46	.....	.....	.....	55.2	+1.7	85	26	72	26	19	38	45	.....	.....	.16	−.6	3	11.0	sw.	30	w.	7	14	10	7	4.5	.0	.0	3
Salt Lake City [1]	4,227	32	46	25.55	29.89	+.03	56.0	+.3	91	27	69	32	9	43	40	32	46	.68	−1.1	9	9.1	se.	30	n.	10	8	11	12	5.6	T	.0	5
Grand Junction	4,602	60	68	25.28	29.82	−.01	61.3	+.2	88	28	74	37	9	49	35	31	39	1.04	+.2	5	7.4	se.	31	nw.	16	7	12	12	5.9	T	.0	5
Northern Plateau							53.5	−2.3									56	0.75	−0.6										6.2			
Baker [2]	3,471	36	54	26.48	30.05	+.09	47.8	−3.9	78	26	60	23	12	36	39	35	68	.51	−1.0	10	6.3	n.	20	nw.	7	8	11	12	6.0	1.0	.0	2
Boise [1]	2,739	5	49	27.16	29.98	+.04	54.0	−2.1	83	27	67	27	11	41	35	34	52	.72	−.7	5	10.6	nw.	33	nw.	15	8	14	9	5.7	T	.0	2
Pocatello [1]	4,478	5	31	25.43	29.92	+.03	52.6	−.4	88	27	66	24	13	40	44	31	50	.84	−.9	9	12.1	sw.	34	sw.	5	10	11	10	5.6	T	.0	1
Spokane [1]	1,929	27	42	27.99	30.02	+.06	52.4	−3.1	79	25	64	31	12	41	35	37	62	1.19	−.2	13	7.6	sw.	33	n.	9	4	11	16	7.2	T	.0	2
Walla Walla	991	57	65	29.01	30.06	+.10	57.2	−2.4	83	24	67	36	12	48	30	.....	.....	1.06	−.6	11	6.8	s.	25	sw.	9	8	9	14	6.0	.0	.0	0
Yakima	1,076	58	67	28.90	30.04	.....	57.0	−2.0	86	24	68	36	6	46	34	36	50	.17	−.5	6	7.0	nw.	22	w.	22	5	10	16	7.0	.0	.0	1
North Pacific Coast Region							54.1	−0.5									71	1.98	−0.3										6.4			
North Head	211	5	56	29.95	30.17	+.14	50.6	−.3	59	24	55	43	10	46	13	45	82	2.97	.0	17	14.5	n.	42	nw.	7	3	10	18	7.3	.0	.0	0
Seattle [1]	125	90	321	30.00	30.03	+.02	54.6	−2.0	75	24	62	42	10	47	28	42	68	1.77	−.1	14	8.9	s.	34	sw.	31	2	17	12	6.7	.0	.0	2
Tacoma	194	172	201	29.94	.....	.....	53.6	−.5	73	19	62	39	17	46	26	.....	.....	1.11	−1.0	11	9.1	sw.	29	sw.	9	9	12	10	5.6	.0	.0	3
Tatoosh Island	86	9	61	30.06	30.15	+.14	49.6	.0	59	24	53	41	10	46	13	44	82	3.60	−.4	19	10.4	w.	37	w.	9	3	10	18	7.5	.0	.0	0
Medford [1]	1,329	29	58	28.70	30.08	.....	57.1	−1.1	92	24	71	33	14	43	46	39	60	.67	−.5	4	.....	nw.	.....	.....	.....	12	10	9	5.1	.0	.0	1
Portland, Oreg [2]	154	68	106	29.98	30.14	+.11	56.6	−.3	84	24	65	41	12	48	28	44	70	1.65	−.5	9	5.7	nw.	18	w.	10	6	13	12	6.4	.0	.0	2
Roseburg	510	45	76	29.60	30.14	+.11	56.7	+.7	88	24	69	35	14	44	39	42	64	2.06	+.1	9	4.5	n.	18	n.	7	6	11	14	6.2	.0	.0	0
Middle Pacific Coast Region							61.5	+1.8									62	1.30	0.0										4.2			
Eureka	60	72	88	30.10	30.15	+.10	51.7	−.3	64	24	56	42	11	48	17	47	84	4.25	+2.4	5	9.5	n.	29	n.	10	11	8	12	5.4	.0	.0	0
Redding [1]	722	20	34	29.21	29.96	.....	68.2	+1.8	100	24	80	42	16	56	31	37	37	.66	−.9	2	9.5	nw.	26	nw.	14	14	8	9	4.6	.0	.0	0
Sacramento [2]	66	92	115	29.88	29.94	.00	67.4	+4.1	98	24	81	42	15	54	35	45	53	.14	−.6	1	9.0	s.	26	nw.	8	20	8	3	2.6	.0	.0	0
San Francisco	155	112	132	29.84	29.99	.00	58.6	+1.8	91	23	66	46	13	52	38	46	75	.13	−.7	2	9.9	w.	34	w.	14	13	11	7	4.1	.0	.0	0
South Pacific Coast Region							67.0	+3.6									59	T	−0.4										4.4			
Fresno [1]	327	5	35	29.57	29.90	−.02	70.4	+3.2	103	24	86	43	16	54	39	41	43	.00	−.4	0	8.2	nw.	27	n.	17	18	6	7	3.3	.0	.0	0
Los Angeles	338	223	250	29.58	29.92	−.03	65.5	+3.3	88	19	75	49	16	56	34	49	64	T	−.4	0	6.3	w.	23	w.	9	16	6	9	4.3	.0	.0	0
San Diego [1]	87	20	55	29.85	29.92	−.03	65.0	+4.2	87	19	73	50	18	57	32	53	70	.02	−.3	1	6.8	w.	17	nw.	9	7	12	12	5.7	.0	.0	0
West Indies																																
San Juan, P. R.	82	10	54	29.91	30.01	.....	77.2	−1.4	83	30	80	69	1	74	12	71	80	8.24	+3.0	19	12.2	e	.30	e.	10	5	7	19	12.2	.0	.0	2
Panama Canal																																
Balboa Heights	118	6	92	.....	[3] 29.82	.00	80.8	+.1	94	10	88	71	18	74	19	.....	[3] 84	6.68	−1.4	19	4.8	nw.	24	s.	12	0	19	12	7.2	.0	.0	9
Cristobal	27	47	97	.....	[3] 29.83	−.01	81.3	+.6	91	13	86	74	1	77	15	75	[3] 84	16.27	+3.8	21	7.4	n.	26	sw.	12	1	11	19	7.7	.0	.0	15
Alaska																																
Anchorage	135	36	47	.....	[4] 29.97	.....	46.1	+1.1	69	13	57	26	4	35	...	33	60	.64	+.1	3	5.8	nw.	24	s.	23	4	7	20	.....	T	.0	0
Fairbanks	455	4	82	29.95	.....	.....	47.2	+.3	75	30	61	24	19	34	38	33	58	.43	−.2	8	7.3	w.	31	sw.	2	4	12	15	6.9	1.3	.0	3
Juneau	80	96	116	.....	[4] 30.05	.....	48.1	+.4	65	31	55	34	4	41	...	37	71	3.65	−1.6	17	6.3	se.	21	e.	21	3	6	22	.....	.0	.0	0
Nome	43	25	51	29.94	.....	.....	37.3	−3.2	63	31	44	26	18	31	35	32	85	1.95	+1.3	14	8.4	w.	28	s.	23	2	8	21	7.7	5.7	.0	.0
Hawaiian Islands																																
Honolulu	38	86	100	29.96	30.00	−.04	76.0	+1.2	84	23	81	66	4	71	14	.....	.....	2.81	+1.1	16	8.6	ne.	23	ne.	3	7	18	6	5.2	.0	.0	3

LATE REPORTS FOR APRIL, 1943

Alaska																																
Bethel	22	5	32	[4] 29.60	.....	.....	25.9	−1.7	52	29	34–12	5	18	36	20	75	.08	−.5	4	.....	n.	.....	.....	.....	7	6	17	6.5	.7	.0	0
Ketchikan	75	69	91	[4] 29.86	[4] 29.88	.....	43.6	+1.0	71	27	50 31	26	37	35	37	80	13.97	+2.9	23	7.9	se.	27	s.	21	4	3	23	8.2	1.5	.0	0
Kotzebue	20	4	31	[4] 29.78	[4] 29.80	.....	10.8	−3.7	42	11	22–44	5−1		38	9	88	T	−.3	0	.....	e.	33	w.	4	15	4	11	4.7	T	7.0	0
McGrath	331	4	31	[4] 29.30	[4] 29.67	.....	28.0	.....	59	28	40–24	1	16	43	18	63	.01	−.5	1	.....	n.	25	sw.	15	7	6	17	6.6	.4	.0	0
Northway	.....	5	32	[4] 27.86	.....	.....	29.5	.....	62	29	44–13	1	15	42	18	65	.20	.....	4	.....	w.	.....	.....	.....	7	13	10	6.0	.7	.0	0

[1] Data are airport records.
[2] Barometric data (adjusted to old city elevation) and hygrometric data from airport; otherwise city office records.
[3] Observations taken bihourly.
[4] Pressure not reduced to a mean of 24 hours.
[5] Wind, clear, partly cloudy and cloudy data from city office records; other data from airport.
[6] Temperature, pressure (adjusted to old city elevation) and hygrometric data from airport; otherwise city office records.

NOTE.—Except as indicated by notes 1, 2, 5, and 6 data in table are city office records.

SEVERE LOCAL STORMS, MAY 1943

NOTE: The data for May will be published in the June issue of the REVIEW.—ED.

SOLAR RADIATION AND SUNSPOT DATA FOR MAY 1943

[Solar Radiation Investigations Section, I. F. HAND in charge]

SOLAR RADIATION OBSERVATIONS

Explanations of the tables and references to descriptions of instruments, stations and methods of observation, and to summaries of data, are given in the January 1942 REVIEW, page 20; a list of pyrheliometric stations is also given in the REVIEW for January 1943, page 12.

TABLE 1.—*Solar radiation intensities during May 1943*

[Gram calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
May 1	3.81	0.86	0.94	0.90	1.26	1.48		*Smoky*			3.48
May 4	5.38	.68	.77	.91	1.13						6.04
May 14	4.78	.62	.71	.74	.90						4.57
May 21	7.92	.42	.49	.61	.88	1.25					8.86
Means		.64	.73	.79	1.04	(1.36)					
Departures		+.02	−.05	−.18	−.07	−.01					

TABLE 1.—*Solar radiation intensities during May 1943*—Con.

LINCOLN, NEBR.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
May 11	6.81					1.38	1.14	0.95	0.83	0.73	7.06
May 27	6.81					1.36	1.11	.95	.88	.82	6.05
Means						(1.37)	(1.12)	(.95)	(.86)	(.78)	
Departures						−.01	−.01	+.04	+.06	+.11	

BLUE HILL, MASS.

	mb.										*mb.*
May 1	5.3	0.76	0.85				1.24	1.15	1.11	0.91	3.5
May 2	4.8	.91									4.4
May 4	7.1	.50	.58								6.9
May 5	5.8	.78	.87	1.03	1.18	1.46	1.21	1.04	.89	.78	3.2
May 6	5.8	.84	.94	1.08							6.6
May 13	11.8							.85	.72	.60	10.6
May 14	6.1			.99	1.13	1.42			.50	.42	6.3
May 23	9.5	.23	.32	.43	.65	.90	.70	.52	.39	.31	10.2
May 28	11.8				1.06						11.4
May 29	11.8	.52	.65	.79	.97						10.2
Means		.65	.70	.86	1.00	1.26	1.05	.82	.72	.60	
Departures		.00	−.11	−.13	−.01	−.10	−.03	.00	−.03	−.05	

*Extrapolated.

TABLE 1.—*Daily and weekly totals of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Date	Washington	Madison	Lincoln	East Lansing	New York	Columbus	Fairbanks	Nashville	Twin Falls	La Jolla	New Orleans	Riverside	Blue Hill	Newport	State College	Put-in-Bay	East Wareham	Davis, Calif.
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Apr. 30	177	566	665		98	253	450	328	531	613	698	576	81	97	273	141	121	602
May 1	699	651	473		726	718	517	658	461	374	646	625	533	725	613	723	563	736
May 2	410	481	645		558	129	434	502	623	562	655	503	639	642	326	138	646	553
May 3	518	600	552		289	242	546	626	282	532	693	445	18	45	184	195	27	615
May 4	346	381	442		196	682	512	609	613	483	652	172	325	414	296	703	299	484
May 5	538	483	310		685		450	617	544	447	711	469	730	706	454	361	649	675
May 6	542	552	426		512	450	576	577	707	130	695	596	227	207	456	516	301	743
Mean	**462**	**530**	**502**		**438**	**414**	**498**	**559**	**523**	**448**	**678**	**484**	**365**	**405**	**372**	**397**	**372**	**630**
Departure	**−13**	**+86**	**+43**		**−16**		**+79**	**+71**	**+1**	**−126**	**+255**	**−38**	**−103**	**−80**	**−111**			
May 7	466	323	133		451	360	503	601	554	367	469	505	457	501	300	163	462	772
May 8	615	660	666	299	536	240	414	308	688	627	640	671	396	515	287	133	496	772
May 9	548	330	91	528	682	423	255	411	677	688	589	676	674	708	599	478	658	740
May 10	410	93	596	99	175	367	137	524	653	688	396	649	178	163	245	171	189	741
May 11	202	502	693	85	91	128	463	441	720	703	703	641	74	68	58	244	97	788
May 12	412	192	60	599	102	395	556	393	706	624	678	632	106	149	316	674	215	769
May 13	665	696	679	501	617	226	444	645	564	672	668	637	576	685	428	315	647	727
Mean	**481**	**400**	**417**	**352**	**379**	**306**	**396**	**474**	**652**	**634**	**592**	**630**	**351**	**399**	**319**	**311**	**395**	**758**
Departure	**+16**	**−52**	**−36**		**−63**		**−59**	**−14**	**+71**	**+35**	**+143**	**+77**	**−119**	**−71**	**−127**			
May 14	142	622	96	632	530	715	476	459	703	575	703	549	663	648	700	685	634	711
May 15	185	47	141	190	438	150	502	460	354	580	517	589	678	728	274	206	538	716
May 16	288	319	536	559	177	474	364	409	350		647	685	326	426	180	419	386	765
May 17	618	254	113	132	418	234	308	589	483	706	687	677	549	370	398	144	545	771
May 18	660	162	586	188	457	388	468	569	708	712	491	696	225	383	416	195	343	758
May 19	573	423	266	118	300	435	487	548	706	705	462	659	384	268	370	126	260	692
May 20	400	130	604	138	266	284	469	392	618	659	389	640	249	265	246	182	230	738
Mean	**410**	**280**	**334**	**280**	**369**	**383**	**439**	**489**	**560**	**656**	**557**	**642**	**439**	**441**	**369**	**280**	**419**	**736**
Departure	**−64**	**−190**	**−172**		**−95**		**−7**	**+24**	**−44**	**+97**	**+98**	**+106**	**−61**	**−78**	**−69**			
May 21	304	681	494	438	86	183	580	367	579	647	535	641	69	81	306	208	96	718
May 22	439	632	384	631	205	675	502	705	620	543	380	632	182	218	654	687	300	726
May 23	581	272	478	265	599	240	474	203	720		397	602	619	657	510	308	631	765
May 24	300	211	581	85	550	132	616	260	728	334	520	486	582	626	213	161	606	734
May 25	284	132	742	434	372	282	470	355	700	298	551	446	547	681	158	428	654	734
May 26	571	182	718	406	179	596	443	705	707	203	803	527	140	179	552	601	176	739
May 27	636	329	757	421	530	604	555	380	574	388	692	383	418	646	555	573	525	752
Mean	**445**	**348**	**593**	**383**	**360**	**388**	**520**	**425**	**661**	**402**	**554**	**531**	**365**	**441**	**421**	**432**	**427**	**738**
Departure	**−53**	**−146**	**+49**		**−111**		**+57**	**−61**	**+34**	**−110**	**+108**	**−7**	**−88**	**+17**	**−15**			
May 28	350	575	673	577	439	662	561	658	606	672	474	505	587	606	529	680	434	731
May 29	651	400	702	161	554	557	527	672	565	521	520	425	534	624	497	197	585	585
May 30	269	229	418	264	525	465	603	288	345	495	397	407	570	687	96	363	507	164
May 31	430	280	660	246	570	352	661	353	356	569	578	513	677	699	146	238	726	228
June 1	497	478	650	268	98		554	599	393	209	608	339	275	264	495	468	327	777
June 2	564	375	727	186	408		484	647	568	382	652	477	436	504	237	471	443	800
June 3	666	468	771	502	443		620	518	509	353	510	397	650	677	556	640	709	722
Mean	**490**	**401**	**657**	**315**	**434**	**509**	**573**	**533**	**477**	**457**	**534**	**438**	**533**	**580**	**365**	**437**	**532**	**572**
Departure	**−17**	**−87**	**+132**		**−69**		**+92**	**+1**	**−109**	**−103**	**+61**	**−97**	**−5**	**+8**	**−94**			
ACCUMULATED DEPARTURES ON JUNE 3, 1943																		
	+294	**+196**	**+2737**		**−3304**		**−1561**	**−560**	**+287**	**−4837**		**−1617**	**−3500**	**−1967**	**−2982**			

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR MAY 1943

Communicated by Capt. J. F. Hellweg, U. S. N. (Ret.), Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count, are included assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic				Area of spot or group	Spot count	Plate quality	Observatory
			Difference in longitude	Longitude	Latitude	Distance from center of disk				
1943	h m		°	°	°	°				
May 1	10 58	7574	−22	301	+1	23	242	4	G	U. S. Naval.
				(323)	(−4)		242	4		
2	14 5	7574	−8	300	+1	10	194	1	VG	Do.
		7574	−4	304	+1	6	97	9		
				(308)	(−4)		291	10		
3	10 33	7574	+4	301	+1	6	194	1	G	Do.
		7574	+7	304	+1	8	24	3		
				(297)	(−4)		218	4		
2	12 15	7574	+18	301	+1	19	145	1	G	Do.
				(283)	(−4)		145	1		
5	10 40	7574	+31	301	+1	31	145	1	G	Do.
				(270)	(−4)		145	1		
6	11 5	[*]	−68	189	−9	68	6	1	G	Do.
		7574	+45	302	+1	46	145	2		
				(257)	(−4)		151	3		
7	10 31	7574	+58	302	+1	58	97	1	G	Do.
				(244)	(−4)		97	1		
8	11 8	7576	+7	238	−3	7	48	4	G	Do.
		7574	+71	302	+2	71	97	1		
				(231)	(−3)		145	5		
9	10 46	7576	+20	238	−3	20	48	5	G	Do.
		7574	+85	303	+2	85	97	1		
				(218)	(−3)		145	6		
10	11 26	7576	+34	238	−2)	34	12	1	G	Do.
				(204)	(−3)		12	1		
11	13 14	7578	−84	106	+8	84	485	1	G	Do.
		7577	−77	113	+9	77	48	1		
		7576	+46	236	−3	46	6	1		
				190	(−3)		539	3		
12	10 45	7578	−70	108	+8	70	436	3	VG	U. S. Naval.
		7577	−64	114	+9	65	48	1		
				(178)	(−3)		484	4		
13	10 44	7578	−58	107	+8	59	436	7	VG	Do.
		7577	−51	114	+9	53	48	1		
				(165)	(−3)		484	8		
14	11 10	7578	−45	106	+8	47	388	6	G	Mt. Wilson.
		7577	−37	114	+9	39	48	1		
				(151)	(−3)		436	7		
15	9 41	7578	−31	108	+8	33	388	8	G	Do.
		7577	−24	115	+9	27	36	1		
				(139)	(−3)		424	9		
16	11 41	7578	−17	107	+8	20	388	6	F	Do.
		7577	−9	115	+9	15	24	1		
		7579	+43	167	−44	57	61	5		
		7579	+48	172	−41	59	73	6		
				(124)	(−3)		546	18		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR MAY 1943—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic				Area of spot or group	Spot count	Plate quality	Observatory
			Difference in longitude	Longitude	Latitude	Distance from center of disk				
17	12 16	7578	−3	108	+8	11	388	8	VG	U. S. Naval.
		7577	+5	116	+9	12	24	1		
		7579	+55	166	−43	63	194	11		
		7579	+60	171	−39	66	194	2		
				(111)	(−2)		800	22		
18	11 27	7578	+3	101	+10	12	48	9	G	Do.
		7578	+8	106	+5	11	12	2		
		7578	+10	108	+8	14	291	4		
		7577	+19	117	+9	21	24	1		
		7579	+68	166	−43	72	291	11		
		7479	+73	171	−40	75	242	4		
				(98)	(−2)		908	31		
19	10 41	7578	+15	100	+10	20	48	10	VG	Do.
		7578	+23	108	+8	27	291	4		
		7577	+32	117	+9	33	12	2		
		7579	+79	164	−43	81	242	11		
		7579	+87	172	−39	87	194	3		
				(85)	(−2)		787	30		
20	10 31	[*]	+25	97	−3	25	6	2	G	Do.
		7578	+37	109	+8	39	291	1		
				(72)	(−2)		297	3		
21	12 12	7578	+50	108	+8	51	291	5	F	Do.
				(58)	(−2)		291	5		
22	10 45	7578	+63	109	+8	64	291	4	G	Do.
				(46)	(−2)		291	4		
23	12 53	7578	+76	107	+8	76	242	4	P	Do.
				(31)	(−2)		242	4		
24	12 47	7581	−73	305	+3	73	97	1	P	Do.
		7580	−21	307	+7	71	97	1		
				(18)	(−2)		194	2		
25	13 34	7581	−60	304	+3	60	73	1	F	Do.
		7580	−58	306	+7	59	73	1		
				(4)	(−2)		146	2		
26	11 7	7581	−48	304	+3	48	48	1	VG	Do.
		7580	−45	307	+7	46	48	1		
				(352)	(−1)		96	2		
27	10 53	7581	−34	305	+3	34	48	2	VG	Do
		7580	−33	306	+7	35	48	2		
				(339)	(−1)		96	4		
28	10 39	7581	−22	304	+3	23	36	2	VG	Do
		7580	−19	397	+7	20	36	2		
				(326)	(−1)		72	4		
29	11 7	7581	−8	305	+3	10	24	1	F	Do.
		7580	−5	308	+7	9	24	4		
				(313)	(−1)		48	5		
30	10 36	7581	+6	306	+3	8	18	1	G	Mt. Wilson.
		7580	+9	309	+7	11	18	1		
				(300)	(−1)		36	2		
31	14 22	7581	+20	304	+3	21	12	3	F	U. S. Naval.
		7580	+23	307	+7	25	6	1		
				(284)	(−1)		18	4		

Mean daily area for 31 days = 285.

*Not numbered.
VG=very good; G=good; F=fair; P=poor.

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, May 1943

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, May 1943

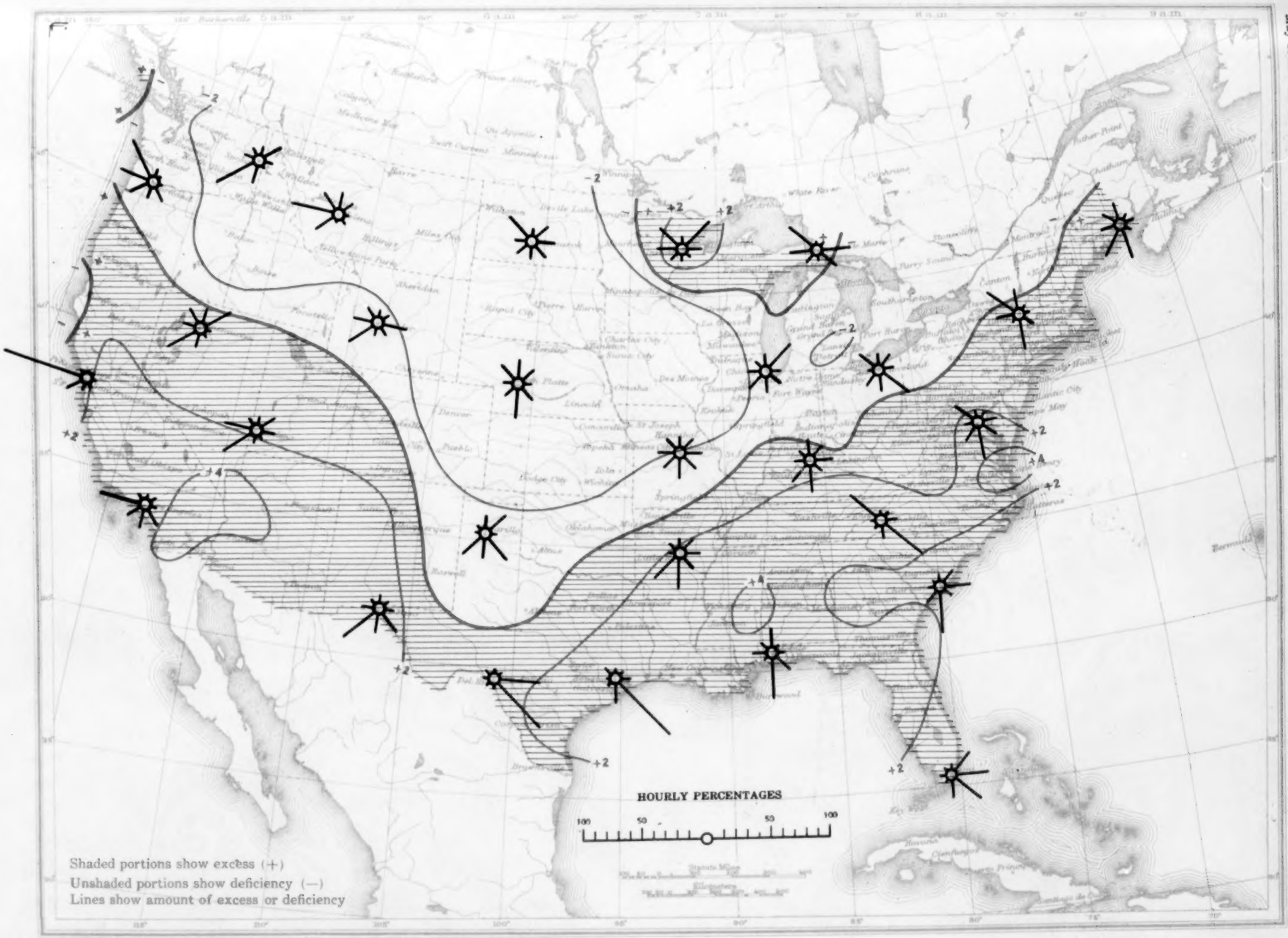
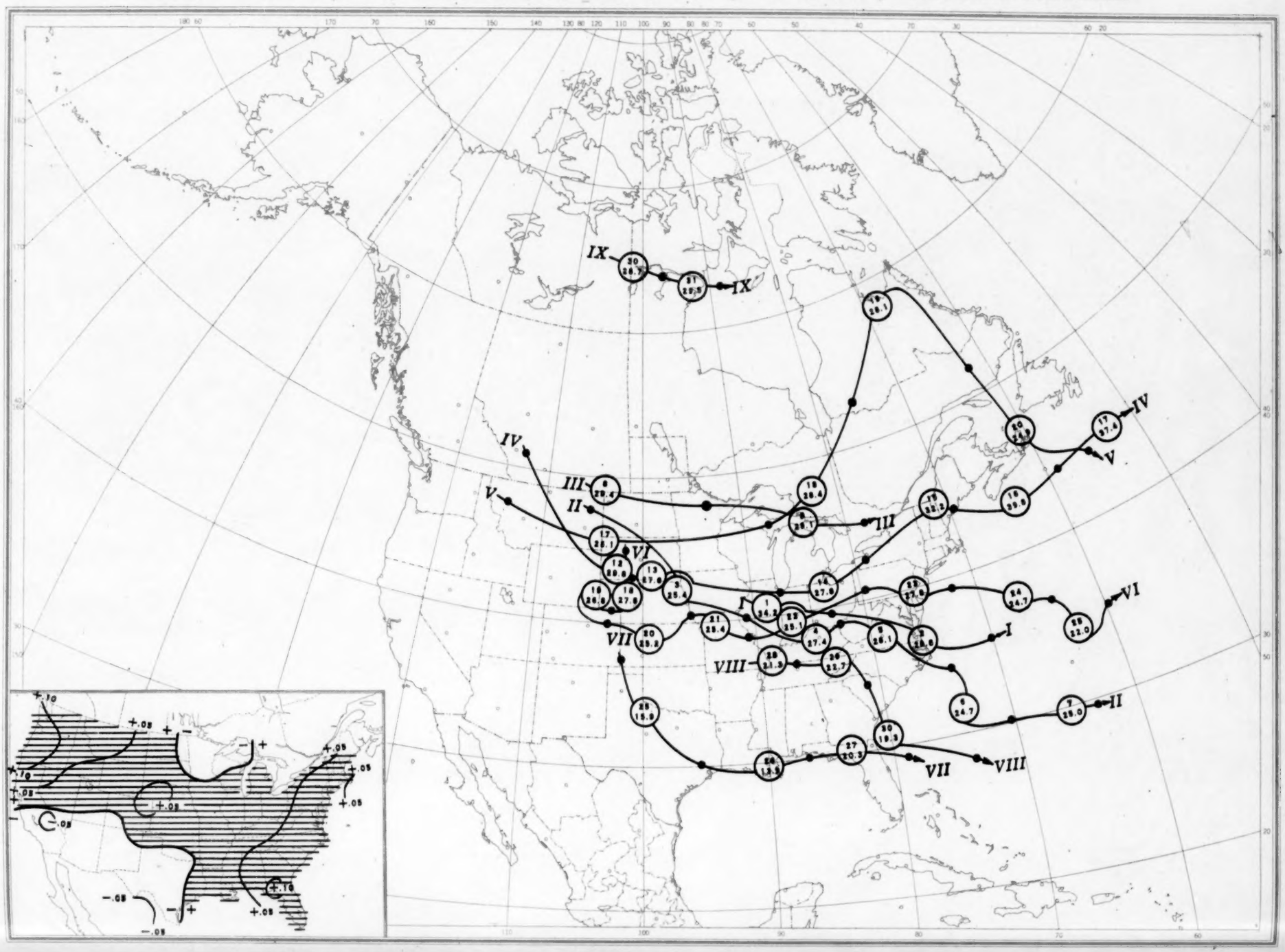


Chart II. Tracks of Centers of Anticyclones, May 1943. (Inset) Departure of Monthly Mean Pressure from Normal

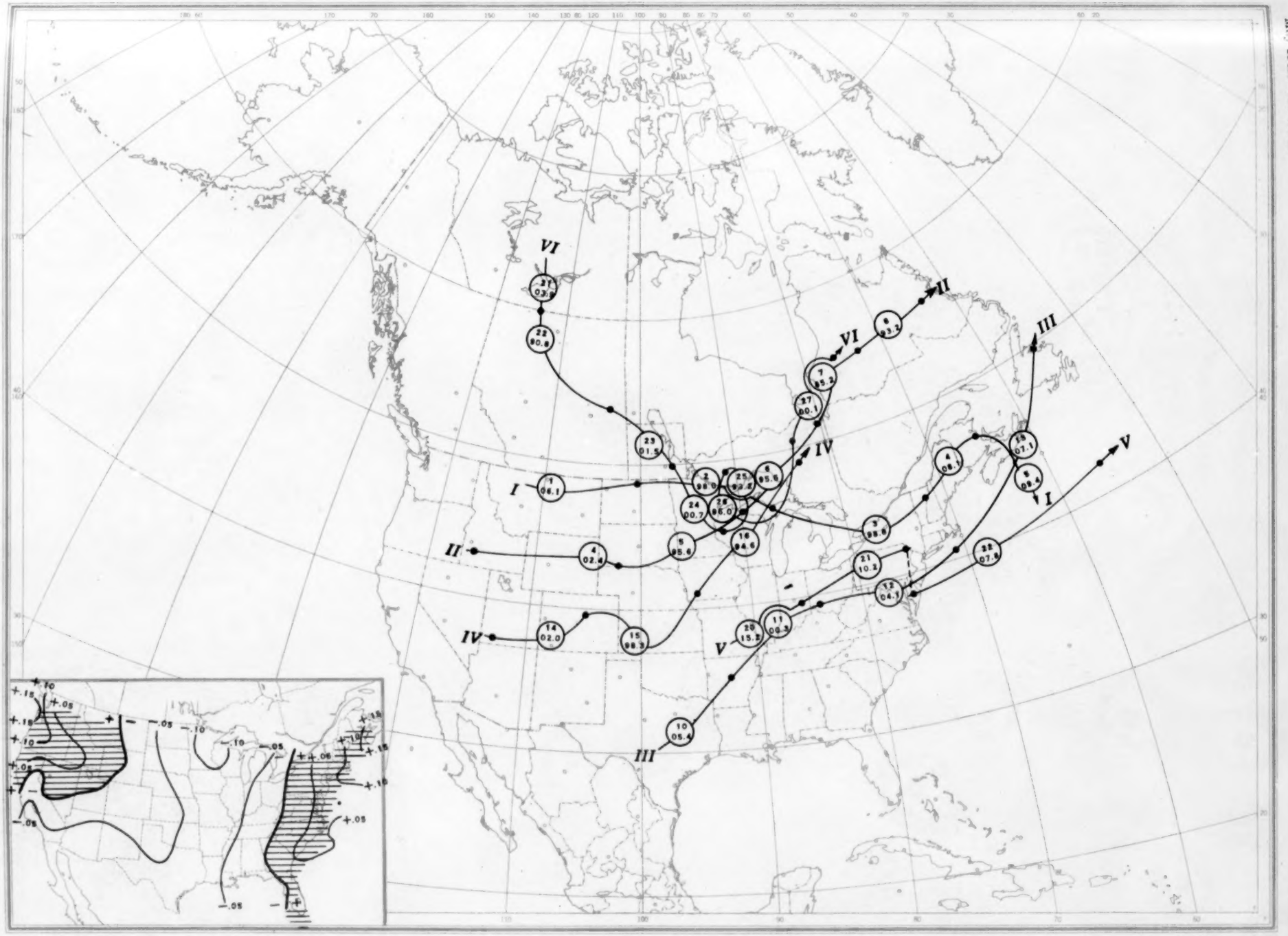


Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, May 1943. (Inset) Change in Mean Pressure from Preceding Month

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, May 1943. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time).

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, May 1943

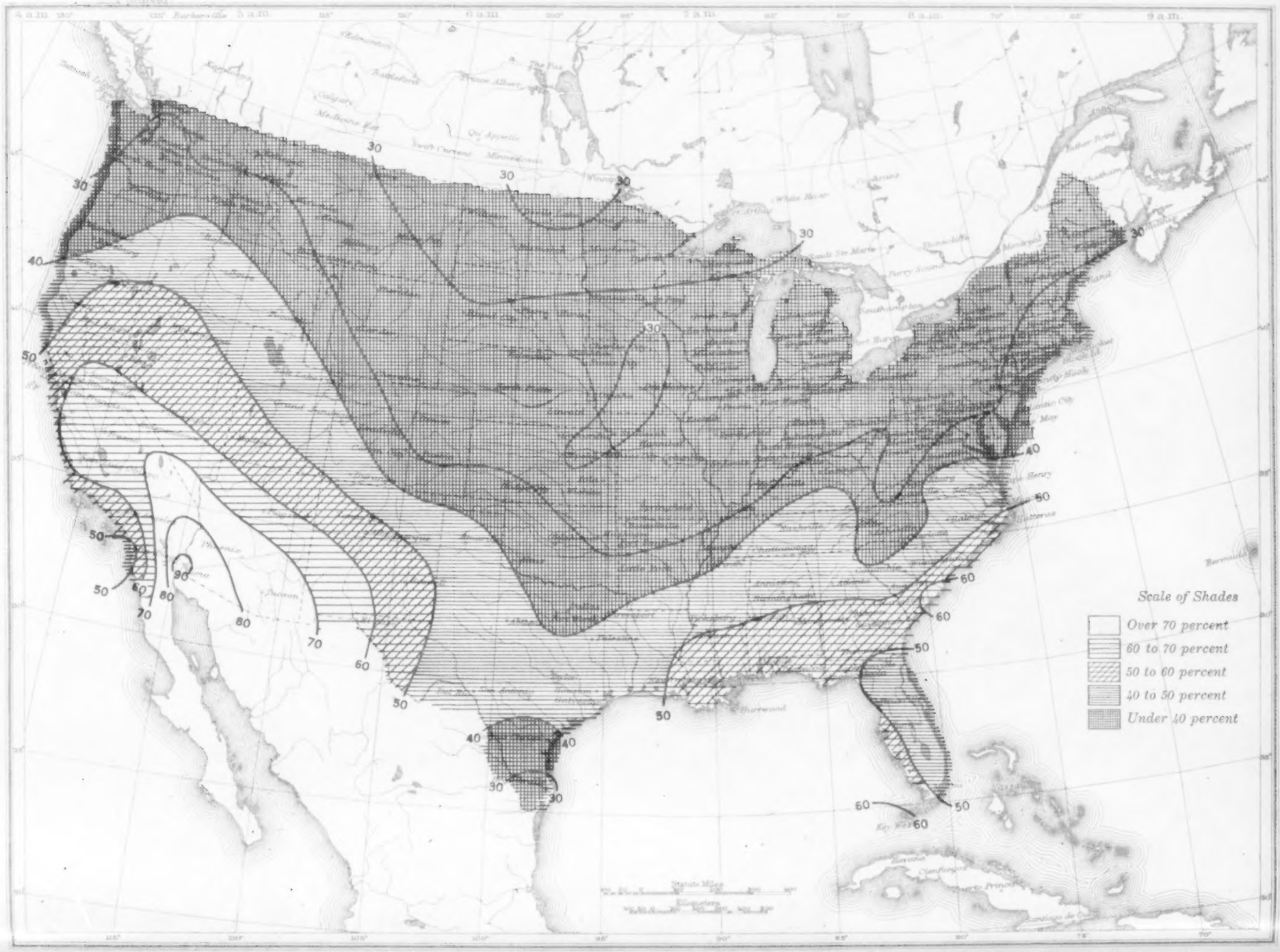


Chart V. Total Precipitation, Inches, May 1943. (Inset) Departure of Precipitation from Normal

Chart V. Total Precipitation, Inches, May 1943. (Inset) Departure of Precipitation from Normal

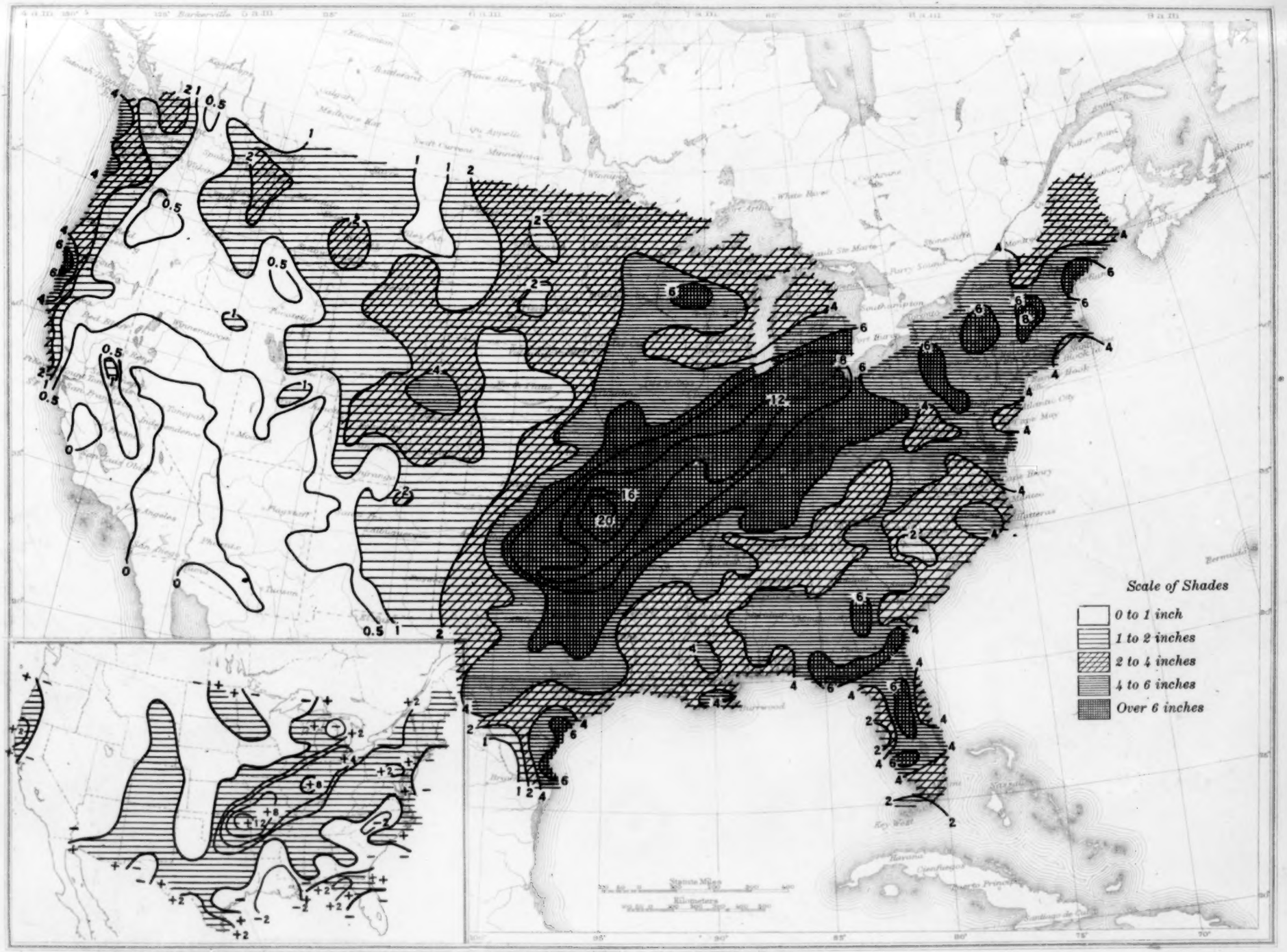


Chart VI. Isobars at Sea Level and Isotherms at Surface; Prevailing Winds, May 1943